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**In stores
Winter 2001**

Technical Information Platform: PC/CD-ROM supporting Win 98/2000/ME/XP

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THE CREW

EDITORIAL

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publish under the same name.

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A few words...

...Where words can never be enough

We were putting the finishing touches to this issue of PC Pilot when the news came in about the shocking terrorist attacks in America. By the time you read this there may have been further developments, but as we write it is clear that the world will be a changed place as a result of what occurred on 11th September.

It didn't take long for largely ill-informed questions to be asked in the media about what role (if any) flight simulation played in this appalling tragedy. On the lunchtime news, the day after the attack, a BBC reporter sat in front of a flickering PC, clutching a joystick and with a Flight Simulator 2000 box propped up on the desk. The monitor showed an airliner in United Airlines livery, paused in front of the World Trade Centre. Viewers were told that the terrorists could have used this 'game', readily purchased from any high street shop, to learn the skills required for their heinous crime. However, after a couple of days it became clear that this supposition was not entirely correct. The hijackers had learned to fly at schools in Florida, obtained technical knowledge from a German university and familiarised themselves with handling large jets by paying for time on commercial simulators.

Unfortunately, it's an old adage that 'mud sticks' and flight simulation currently resembles a ploughed field. A hobby that millions have quietly enjoyed for many years is getting more than its fair share of adverse publicity. All over the Internet we have seen reams written in defence of flight simulation and much of it saying that a PC based flight simulator would be no help in teaching someone to fly an airliner. That's a moot point, but whatever the 'involvement' of flight simulation, we were quite upset to see one news site referring to flight simulation as having "provided inspiration..." to the terrorists. Such a distorted view is not even worthy of comment.

After much rumour and speculation around the Internet, Microsoft announced, for all the best reasons, a delay to the launch of Flight Simulator 2002. This is a great pity, but probably to be expected in the current climate. In the final analysis, the woes of the flight simulation community pale into total insignificance when one considers the appalling tragedy that has taken place. We can complain loudly about our hobby being maligned, but thousands of innocent people are dead and perhaps what is most appropriate under these circumstances is a sense of perspective.

The thoughts of all the staff at PC Pilot are with those who have been touched by this act of barbarism.

Dermot Stapleton
Managing Editor

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It's quality rather than quantity on our latest CD. We've got the demo of IL-2 Sturmovik that everyone's talking about. There's a great aircraft expansion from Just Flight that includes a DC-3, DST and DH-66, as well as charts, videos, utilities and a rather handy piece of software that will get you into the Hyper Lobby.

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PC Train Combat Airliner GA Pilot Magazine

We got a huge response to the letter published in the last issue that suggested we have too much coverage of combat flying in PC Pilot. It seems that about 20% of you think there's too much combat, 20% too little and 60% that we've got it about right.

FROM: Barrie Hanstead

In your 'COMMS' a reader said that he was not interested in combat programs. So, as you have asked for other opinions, I likewise am not interested in them. I find most of your other articles of interest, especially those that recommend video cards and articles about improving frame rates and ways to get the best out of hardware and software.

FROM: Karl Swinden

Here's a 'mature' (43) simmer and real time PPL pilot. I must say, I have only had the last two issues and I can honestly say I am hooked on your publication. I know that you cannot

please everyone...but you certainly try. Keep up the good work! "You are all doing very well," as Mr. Grace from Are You Being Served would say!

FROM: Malcolm Furneaux

Yes, here is that someone in answer to John's letter. Please keep a portion for us combat flight simmers. We only want a share, not the whole magazine. I used to subscribe to a magazine called 'Enemy Lock-on' (subject material obvious!) that was really excellent for us combat simmers but it suddenly stopped a few years back - never knew the reason why. So when I saw PC Pilot on the shelves of my local WH Smiths a few months back I snapped

it up and all the back issues I could get. I rarely get any of the standard computer magazines now because they seem mostly full of shoot-em-up strategy stuff and sports sims - of no interest to me. PC Pilot is great and although I have no interest (as yet) in civil aviation sims I think they should have a full part in the magazine so that people like me have a chance to read up on civil sims and a specialist subject like flight simulation needs as broad an audience as it can get within the flight sim genre to make the magazine pay and therefore continue.

So, keep up the excellent work.

We reply:

We'll continue to try and reflect what goes on in the sky - where you can see military, civil and private aircraft all sharing airspace.

FROM: Nigel Bilton

I recently purchased 2x 256Mb of PC133 memory. With the price at £35 per stick who can resist it? To get to the point, I added this memory to my existing 256Mb, which gave me an incredible 768Mb. Windows ME had no problems with this amount of memory but on running Flight Simulator 2000 it locked up every time. Removing one stick and running with 512Mb was no problem and Flight Simulator 2000 ran quite happily, yet every time I added the third stick it didn't like it. Can you tell me if Flight Simulator 2000 has a memory limitation and/or is there something else I can do? I feel as if I have bought this extra memory and now can't use it.

Greg Gott replies:

From here it sounds like your motherboard is the culprit. Many motherboards, for some reason, cannot handle all DIMM slots being populated; indeed some may have four slots and may exhibit problems with more than two DIMMS in place. These issues are normally tested in modern hardware reviews because of the frequency of this happening. As well, you may encounter a mainboard that simply won't run if a stick of RAM is in a particular slot! We have seen some of these things for ourselves. It really comes down to the quality of the board in question.

Another possible, but less probable answer is DIMM incompatibility. We have witnessed system problems when DIMM X is paired up with DIMM Y, but not as often as the slot issue. It is our opinion that Flight Simulator 2000 will not benefit much beyond 256Mb. If you want to use all your memory, we would suggest replacing your motherboard.

FROM: Colin Geoffrey

As a mid fifty year old with not too many years into computers and flight sim flying and with a passion to fly large transports, I read with great interest Stephen Heyworth's article Taming The Big Jets. How true are the comments about handling and flying a circuit. In my case trying, reduced to tears on many occasions but still coming back. One day it will be right, I hope. I carried out Stephen's suggestion re: pitch changes using FSEDIT and I have found things much improved - many thanks. Two questions arise:

1. When using the FSEDIT I found that some of the aircraft were read-only and therefore I could not make the pitch changes. Can this be got round somehow?
2. Stephen also suggests some tweaking of the flight dynamics. Please can this be clarified. My thanks to Stephen Heyworth for the article and to all of you for the excellent magazine. I have all the copies. Keep the big jets and airliner pieces coming.

Stephen Heyworth replies:

The standard FS2000 planes are protected to prevent users changing their flight parameters in FSEDIT. The best way to get round this is to make a duplicate copy of the aeroplane. This is done by entering FSEDIT and then selecting the plane you want to work with by clicking on it once. Now use the menu at the top of the FSEDIT window to select 'File' -> 'Save Copy As...'. Next, name your new copy. I usually put Alt at the front (e.g. Alt Beech King Air 350) which keeps all these together at the top of the FS2000 menu. You can now edit this copy by double clicking on the aeroplane name and then once on the 'Flight Dynamics' entry. This will open up a panel titled 'configuration', letting you set the 'pitch stability' to 2.0.

The only other tweaks that I would recommend are to consider reducing slightly the joystick sensitivities using the standard control sensitivity setting in FS2000. However you must be careful to ensure that you still have enough control authority to fly the plane. The need for this will depend on your hardware / joystick.

Be cautious of the autopilot in FS2000, as it seems to use the trim to control the plane, and setting the 'pitch stability' can make the autopilot unsteady, but if you are hand flying this is not an issue.

Remember that the key to flying these big jets is to decide on the pitch and speed you want and then to hold them exactly. Good luck and happy landings!

FS 2002



Heathrow may not be as good as some add-ons, but the surrounding terrain is exceptional

A 21st Century Simulator

Before the horror of the events in New York City, Microsoft kindly invited us to their swanky London offices for a checkride in Flight Simulator 2002. In spite of the delayed release date, we thought we should give you some first-hand impressions of this landmark simulation...

Darryl Saunders, Product Manager and himself a qualified pilot, gave us an enthusiastic rundown of the features in the latest Beta. Microsoft has not been deaf to criticisms regarding Flight Simulator 2000's sluggishness, and performance is top of their list of priorities for the new version. The team learned plenty of new tricks with Combat Flight Simulator 2, and FS 2002 is designed to run as fast as Microsoft's latest combat simulator on any given machine. We saw it running on a 900MHz Pentium III laptop with a GeForce2 graphics card, and it ran smoothly with detail levels set to high. Most notable was the distinct lack

of stuttering. We saw some slowing down in very detailed areas, but it remained fluid throughout – to our amazement.

The staggering thing is not that it runs faster than FS2000, but that the view is so much better. In fact, it's better than any other PC flight simulator we've seen, even Flight Unlimited III. The new AutoGen scenery sprouts low-rise buildings and trees at every opportunity. The detailed cities and airports are absolutely stunning, and even more impressive as dusk falls. Taking a sightseeing tour around Las Vegas was a truly jaw-dropping experience. Jumping over to Alaska was awe-inspiring, with snow-capped mountains casting shadows on the valleys below – all computed with the dynamic lighting engine.

The virtual cockpit view has been updated beyond recognition, with fully working instruments and a smooth scrolling action. You can zoom in and out by fine degrees to obtain your best view, and it is

sure to be every pilot's default way of flying. We tried a couple of quick flights and can confirm that the flight dynamics are somewhat refined, with the Bell helicopter being truly flyable. The floatplane is a wonderful addition, with new animated water textures to boot. The ATC seems to be as good as any we've seen, with the ability to customise your callsign and add your own voices.

We've only managed to scratch the surface for now. Suffice it to say that we're very excited by this latest release of Flight Simulator and we'll be bringing you a massive, in-depth review as soon as we can. We can't wait!

Kenji Takeda

PREVIEW

Publisher:	Microsoft	Price:	£49.99 Standard £69.99 Professional
Website:	www.microsoft.com/games/fs2002	Expected Release Date:	TBA
Developers:	Microsoft		

*Bright lights, big city.
Our jaws are still on the floor in
Microsoft House somewhere*

NEWS

X-Plane 6.0

X-Plane users will be pleased to hear of dozens of new features in X-Plane 6.0, including 1024x768 resolution, an all-new user interface, more planes, dynamic cityscapes with detailed road traffic, more high-resolution cockpit instruments, and a huge number of improvements to the flight model. For the full list of features go to www.X-Plane.com and www.X-Plane.org. Version 6.0 was on its way as we went to press, so look out for a full investigation in a future issue.

Stoenworks, Inc.

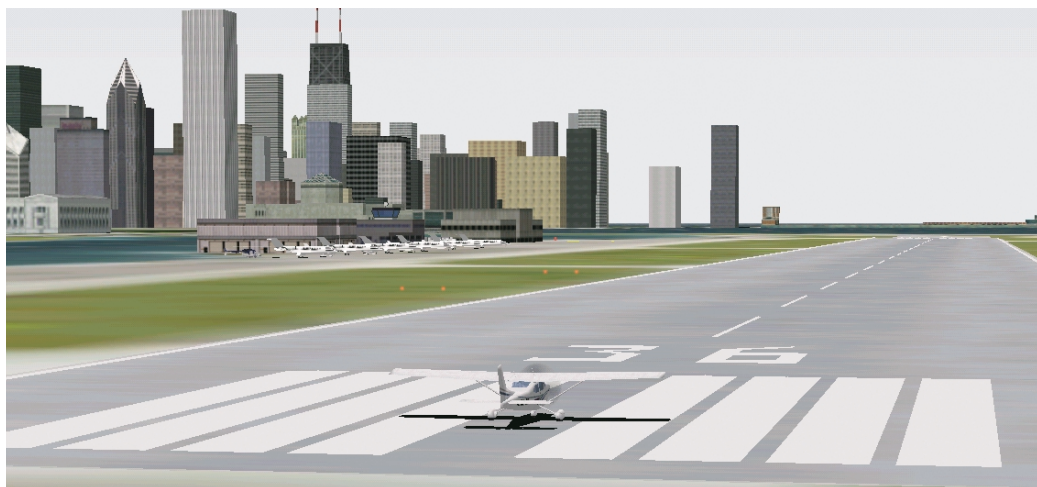
There are now over 20 excellent tutorials on various aspects of flying at Hal Stoen's Stoenworks, Inc. website, and recent additions to the list include tutorials on VFR flight, US airspace, and the HSI (Horizontal Situation Indicator) instrument. All the tutorials are crammed with useful details, techniques, and observations, and are genuinely informative. Hal made a living from flying for over 20 years, mainly as a corporate/charter pilot and flight instructor, and you can get the benefits of his experience at <http://stoenworks.com>.

PC Pilot on CD

A few other back issues of PC Pilot have joined 1, 2 and 3 in the 'sold out' category so we've now produced Issues 4,5 & 6 and 7, 8 & 9 on CD. As well as complete copies of PC Pilot in PDF format, our great value CDs also contain selected items from the cover CDs that were featured on these issues. For more details see page 61 in this issue or visit our website at www.pcpilot.net

Magenta MCP Facelift

Project Magenta have given their famous MCP (Mode Control Panel) a facelift. Enrico Schiratti told us: "We finally uploaded the new MCP; it still includes the 737 and 777 as well, and now also an all-new 747-400 interface. We have added some new features and used different techniques carried over from the Airbus-Type FCU software. We're quite sure you will like it! The Project Magenta MCP/Enhanced Autopilot is much more than a pretty face; it works and feels like its real counterpart and fully interacts with our Glass Cockpit and FMC software." For more details take a look at www.schiratti.com



FAREWELL TO MEIGS

Many fans of Flight Simulator will be sad to hear that the default airfield for over twenty years, Chicago's Meigs Field, is succumbing to the inexorable march of progress. As everyone who has staggered shakily into the air across Lake Michigan is probably aware, Meigs has a highly central location and Mayor Richard Daley will be sending in the bulldozers this winter to convert it into public parkland.

The sentimental attachment between flight simmers and Meigs, which has featured in Flight Simulator since Bruce Artwick's original 1979 creation, is not enough to save it from conversion to something more verdant but arguably less interesting.

Microsoft have confirmed that Meigs will again be the default in Flight Simulator 2002, but they've made no promises that it will

appear in future versions. Darryl Saunders, Microsoft's product manager, told us their policy is to only feature real airports, although we heard that Glenview Naval Air Station is still around, despite its disappearance from the real world in 1993.

In future, it looks like anyone that fancies landing in a handy spot for downtown Chicago will need to use something with floats.

OUT THERE IN THE REAL WORLD



Those of you with a broad interest in aviation issues might want to take a look at the PPRuNe website. The Professional Pilots Rumour Network contains some fascinating reading. As well as a 'wannabe' index for those looking for a career

in aviation, there are features on technical and safety issues, and weather reports where you can check on departure and destination TAFs, METARs, and NOTAMS. Of particular interest are the postings in over 60 forums, where you can

look into frank debates on the vast range of issues concerning those who make their living in aviation. These should certainly put things in perspective if you ever forget that our problems are nothing more serious than poor frame rates and frustrating downloads. Keep informed on the views from the sharp end at www.pprune.org.

SHOWTIME!

The details of this year's European Computer Flight Simulation 2001 Exhibition (rolls off the tongue!) have been announced. The gathering on Saturday 24th November will be the eighth annual UK show organised by RC Simulations and we're promised that there'll be something for anyone who's interested in flying on their PC. The show was originally organised



by RC Simulations and the Flight Simulation User Group as their annual open day, but eight years later it's a major calendar event. Among this year's exhibitors will be CH Products, Go Flight, Saitek and Thrustmaster, showing all

their latest hardware. Tickets are priced at £6.50 for adults, £5.50 for under 16s/over 60s and it will be held at the National Motorcycle Museum, next to the NEC Birmingham.



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ON THE CD



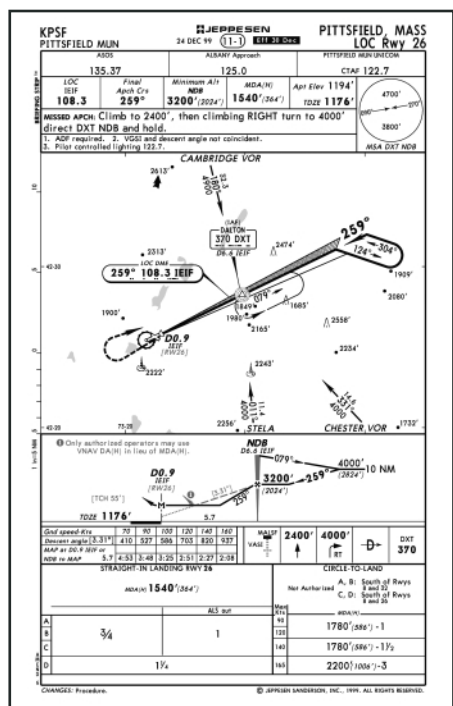
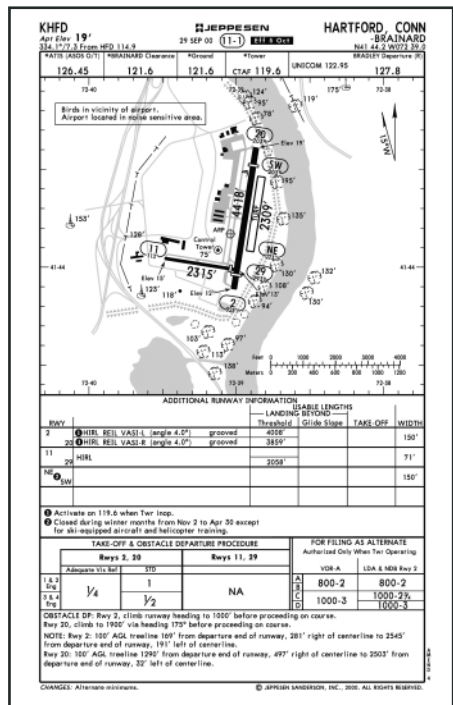
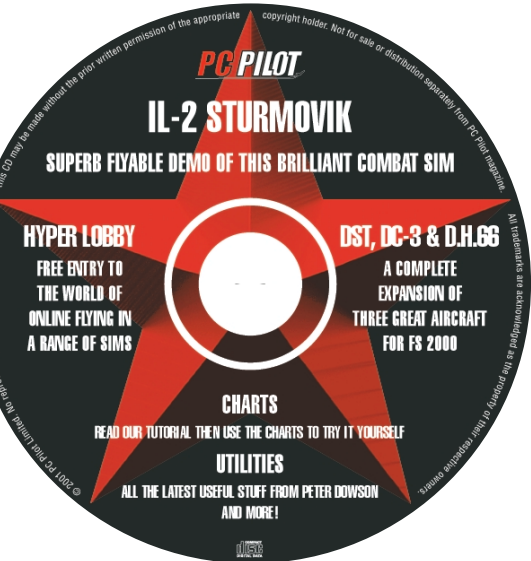
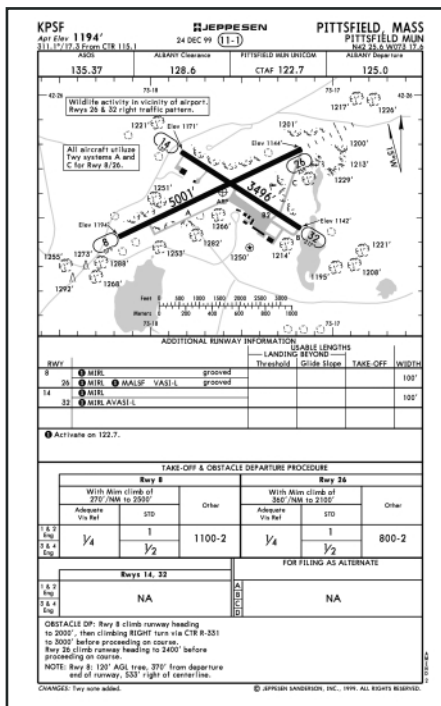
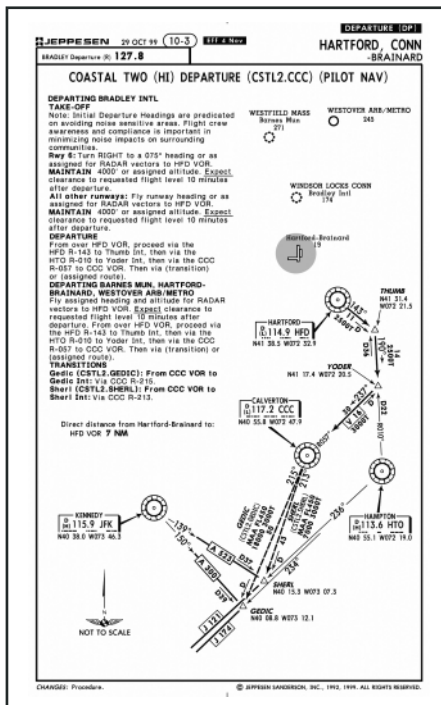
IL-2 DEMO

Here's the one that everyone's talking about. Hot off the press from Ubisoft and developers 1C Games, this is undoubtedly the best thing in combat simulations for years. Wrap up well — the Eastern Front gets cold around this time of year!



CHARTS

The charts for our latest tutorial are on the CD in easy to use PDF format. If you have any trouble accessing the charts, go to 'My Computer', left click on the CD icon and select 'Explore'. You can then open the folders as required.



DST, DC-3 & D.H.66

Too much combat in PC Pilot, eh? Hopefully this excellent add-on from Just Flight will redress the balance. There are three complete aircraft for Flight Simulator 2000 that were originally planned to be part of the popular FS Classics range. Now you can load them up and have a flight for free!



Here's a few other goodies...

FS2002 MOVIE

Here's all the latest videos of Flight Simulator 2002 in action. Take a peep and be amazed!

FS TOOLKIT MOVIE

To give you an idea of what's possible with FS Toolkit here's a small .avi movie to accompany the feature on page 42.

Click on the FS2002 movie button in the main menu

HYPER LOBBY

A free entry ticket to a combat flying arena that will keep you on the Internet for hours. Get the details from our feature on page 44.

PETER DOWSON'S UTILITIES

As usual, we're including all the latest releases in Peter's excellent range of free utilities for Flight Simulator.

WINZIP, ADOBE READER

You'll need these important utilities to open up zip files and read online manuals or charts.



IMPORTANT - TECHNICAL SUPPORT

The CD and software on it is free and as such, PC Pilot, nor any of the publishers or developers of the software supplied on the CD can provide technical support. The software is supplied very much 'as is' and without support. Enjoy the CD and the software on it!

AS REAL AS ITS GOT !

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Microsoft Flight Simulator 2002 Professional

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When Flight Simulator 2002 Pro is released it'll have a suggested retail price of £69.95. R.C.

Simulations have a very special exclusive deal. We will be selling FS2002 at £59.95 including a **FREE CD** by Aerosoft (NOT available in the shops] which contains photorealistic airports in Germany and Switzerland, also an airship for 2002 and an adventure to fly between Heathrow and Stanstead. Order your FS2000 before November 24th 2001 and get **FREE 1st class postage** as well!!!!



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COMANCHE 4

Search and Destroy!

NovaLogic's Comanche 4 project was recently reactivated, and some very impressive screenshots can be seen on the Internet. The team responsible for Comanche 4 has been involved in various other fine titles, including the Delta Force series and F22 Lightning III, and Comanche 4's producer, Wes Eckhart, was kind enough to elaborate on a few issues concerning the latest version. Those of us with itchy trigger fingers and a love of low-level flying were hoping to see the new Comanche make an appearance before November, and it's interesting to hear Wes's explanation:

"Development was put on hold until we had the technology in place that would allow us to create something unique. Utilising the latest developments in 3D technology we have been able to create some groundbreaking effects, from rotor wash effects to dense foliage that can be used as cover whilst in stealth mode."

NovaLogic promise that the new version of Comanche 4 will have no shortage of weaponry to deal with. Expect T-72s, T-80s, APCs and anti-aircraft guns, and aerial attacks will be coming from the Ka-50m, the Ka-52 and the Mi-24. Head-to-head pilots will be armed with an arsenal which includes AGM-114 Hellfire laser-guided anti-tank missiles, Hydra-70 rockets, Stinger air-to-air missiles, and of course the devastating XM301 20mm cannon. The emphasis is going to be on combat as much as flying and you'll find no shortage of targets on which to test your destructive power, whether it's tanks, shipping, other aircraft, or ground forces.

The beauty of the Comanche simulators is that they have always had an easy learning curve, while at the same time offering realistic physics and damage models, and this has clearly appealed to a wide spectrum of both simulation and games fans – over two million to date. Not all

simulations aim to please both camps of likely buyers – the flight simulation enthusiasts with their demands for realism in the flight model and technical accuracy, and those who just want to get on with it and see what the weapons can do. We asked Wes about the design goals for the new Comanche.

"We have always been very careful to cater to both action gamers and flight sim enthusiasts. Comanche 4 will offer gamers a fun action-based shooter in the skies, with a five minute learning curve – a pick up and play flight model that allows gamers to become immersed into the action straight away. For the hardened sim fans we have also included a scaleable flight model. Players will be able to customise the flight model, while separately adjusting the overall difficulty of the game – for added realism, cyclic, collective and fantail can all be controlled separately to enhance the experience."



Much of the fun of past versions of Comanche has come from combat against sophisticated Artificial Intelligence, so what can we expect from the latest version? Wes reports that the aim is believability. Enemy choppers will be able to make stealth approaches in ground cover to attack the Comanche, and you'll be able to plan a variety of hunting tactics before combat is engaged. AI will also be modelled for the opposing forces on the ground, who'll be best avoided as they carry heat-seeking Stinger missile launchers. Wingmen and friendly AI will have the job of protecting the chopper pilot and making intelligent choices of what to attack. We're also told that communication with wingmen will be possible.

This left us wondering about RCS (Radar Cross Section) and IRCS (Infra Red Cross Section). Are emissions modelled? How will the stealth options work, and just how easy is it going to be to avoid the enemy's prying technological eye?

"The Comanche's stealth is its primary defence against the enemy. The Comanche will be able to use the terrain and the foliage to mask its approach to the target. With its bay doors closed and landing gear retracted, the Comanche has a very small radar cross section. The downside here is the limited firepower available in this configuration. Conversely, if the Comanche is equipped with EFAMS (External Fuel Armament Management System – a pair of stub wings that more than double the amount of ammo the Comanche can carry) its radar cross section balloons dramatically. Each mission will allow the player to choose between stealth and firepower. IR emissions are also modelled."

Campaigns will be set in existing political hotspots that include urban landscapes, tropical island settings and barren desert locales, which should provide enough diversity to keep things interesting (as well as providing plenty of cover for ground forces). The diverse terrain should also provide some tricky tests of your low-altitude flying abilities. 30 missions are promised, as well as a Mission Editor, and objectives will include assaulting a heavily armed aircraft carrier, providing air cover for Delta Force, preventing biochemical warfare, and protecting the President.

If you develop a taste for even more danger, you can get involved in the multiplayer action on NovaWorld, where there'll be up to 31 other flyers online waiting to give you a warm welcome. ■

Leonard Hjalmarson



Wow, those clouds look good!



Superior modelling of buildings abounds



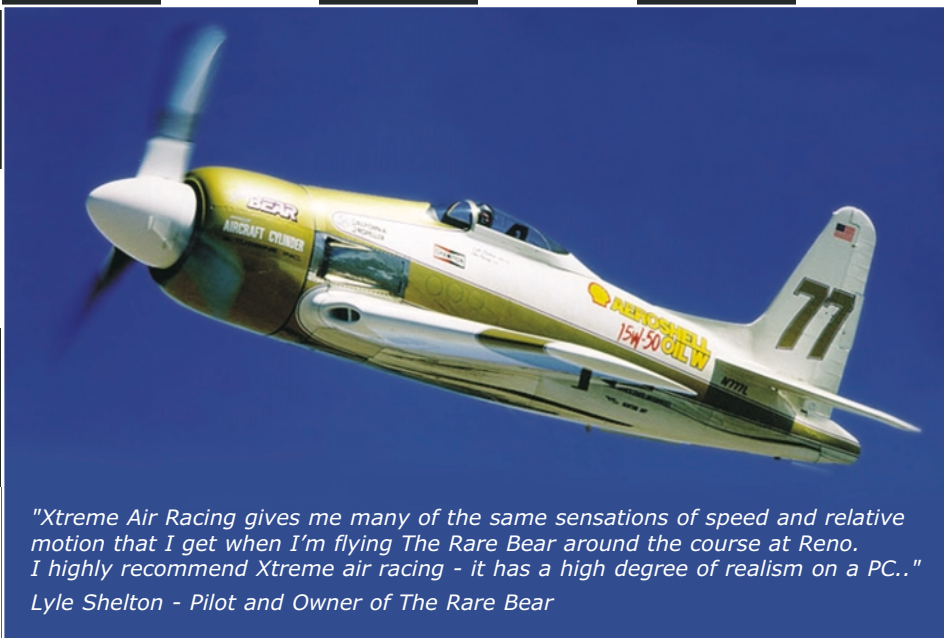
Remember, it's a good landing if you can walk away from it!



The pool attendants round here take their work seriously!

PREVIEW		
Publisher:	NovaLogic, Inc.	Price: £34.99
Website:	www.novalogic.com	Expected Release Date:
Developers:	NovaLogic	November 2001

XTREME AIR



Forget all your sensibilities and get ready for some no holds barred, seat of the pants flying. Tearing along at 450mph, 50 feet off the deck, while jockeying for position with seven other crazy flyers is what this is all about. If you want to see it for real then you'll have to head over to Stead Airport for the annual Reno National Championship Air Races, but Xtreme Air Racing from Victory Interactive is the armchair pilot's alternative, and is certainly not for the faint-hearted.

Licensed by the National Air Racing Association, this simulation has been over five years in the making. So, luckily for us, it means that our PCs are now up to the task of conveying the speed rush that is an intrinsic part of air racing. This is to aviation what Formula One is to land-bound motor sports. Take a P-51, P-38, or

Hawker Sea Fury, then soup it up with a supercharged 3,000 horsepower engine and racing cooling ducts, then add one fearless pilot for a formidable racing package. Put out some pylons to mark the course and it's go-go-go!

You can choose from over 20 aircraft in the Unlimited class, and race on 50 different tracks spanning five regions. Each plane can be customised for each track and local weather conditions. Different engines, propeller sizes, and even wingspan, are just some of the modifications you can introduce. The format is similar to car racing games, with a practice session to familiarise yourself with the track, followed by qualifying to put yourself on the grid, then the eight lap main event. The five second countdown to the airborne start gets the adrenaline

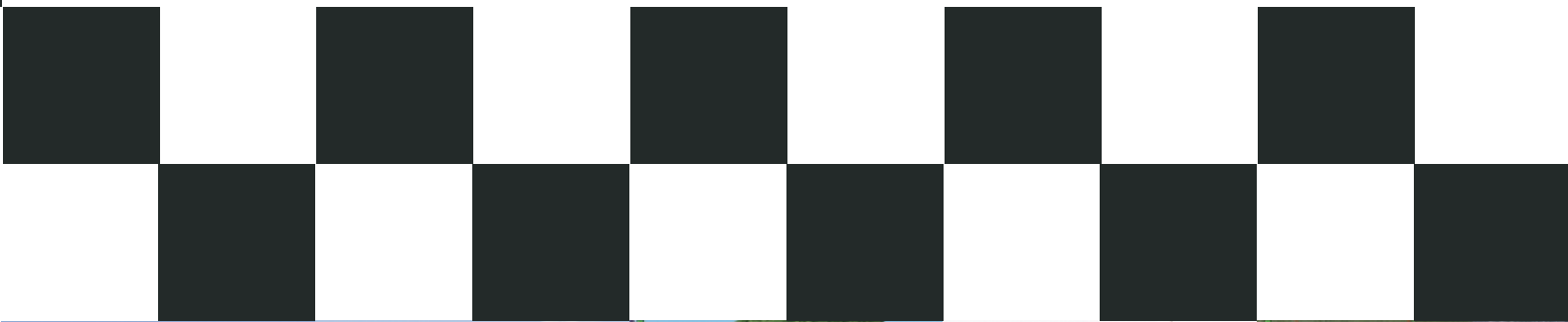
rushing, until the immortal words are uttered, "Gentlemen, you have a race!"

Then all hell breaks loose as eight planes duck and dive for position towards the first pylon. A blast of nitrous oxide can give your engine an all-important boost, but be warned: too much extra juice can end up frying your engine well before the chequered flag. Skilful flying must be combined with shrewd engine management tactics to come out on top. As they say, "Before you can win, you have to finish."

With three levels of difficulty, the learning curve is fairly gentle. Keeping up with the opposition is manageable, although you have to stay on course and not 'cut' any pylons, or else you'll incur a race-crippling time penalty. To help with navigation, there are options for laser pylons that extend right up into the sky, as well as

RACING

It's Go-Go-Go!



The Rare Bear takes on all comers

Formation flying is all the rage

Take a trip to Asia for some mountainous mayhem

An engine with wings, the GeeBee is hard to tame

Who'll make it to the first pylon in pole position?

virtual hoops for you to fly through along the optimum racing line. Purists can stick to the traditional cone and pylon course markers for an extra challenge.

Inside each plane is a virtual cockpit with working dials and excellent propeller blur effects. You can pan around with a joystick hat switch, but by far the best mode is the pylon padlock view. This keeps you looking towards the next pylon to give great situational awareness, and generally keeps other planes in your field of vision. The ground rushes past at a phenomenal rate, providing a truly scary and exhilarating experience. Take it from us, though, this is no arcade game; the flight modelling is as detailed as any we've seen. It includes effects such as pre-stall buffet, compressibility, high alpha asymmetries, ground effect, and other advanced features.

One area in which Xtreme Air Racing excels is propeller wash and wake turbulence modelling. Victory Interactive uses a wake model developed by the NASA Langley Research Centre to compute wing tip vortex behaviour. This is ignored in most flight simulators, but here it's an important effect. Overtaking a P-38 Lightning on steroids is no mean feat. Get too close and your plane may be tossed aside by its tail of dirty air. Sometimes the first sign of a nearby opposing aircraft is a kick from its prop wash or wake. Keeping a vigilant eye out and choosing your racing line take plenty of practice in this cut-throat world of aerial duelling.

The version we tested is in Alpha testing at the moment, and the developers are in the process of adding more graphic detail, as

well as refining the gameplay. Fifty tracks may sound like a lot, but here at PC Pilot we're never satisfied. We suggested that the team include a track editor, as we do love our add-ons, and the wonderful folks at Victory Interactive have promised us that they'll be including one.

If the first thing you do with a flight simulator is find the nearest bridge to fly under, then Xtreme Air Racing is a dream come true. It's the most fun you can have without losing your pilot's licence. ■

Kenji Takeda

PREVIEW			
Publisher:	Mattel Interactive	Price:	£21.00 (approx.)
Website:	www.xtremeairracing.com	Expected Release Date:	
Developers:	Victory Interactive		Autumn 2001

COMBAT ACES

*So stand by your glasses steady,
This world is a world of lies,
Here's a toast to the dead already
And hurrah! for the next man who dies*



If someone was to hold a Lewis gun to the head of some of our contributors, and possibly our readers as well, and force them to choose their all-time favourite WWI flight simulator - the one that kept them away from the real world the most - the original Red Baron might well get a mention. For many it was the first step towards capturing the excitement of the dogfight. Admittedly it has since been superseded by the likes of Flying Corps Gold and, of course, Red Baron II amongst others, but many enthusiasts still have fond memories of that influential package. When we heard that Just Flight

were to release Combat Aces as an expansion for Combat Flight Simulator 2, we wondered whether we were going to see the new Red Baron, or just another red herring.

The Fokker DVII going head-to-head with an S.E.5A through a cloud-filled sky on the box artwork is an alluring depiction of the struggles to come, and it's unfortunate that no screenshots can do justice to the actual graphics. It's always pleasing to find a printed manual, especially when it's well written, informative, and complete with half-toned screenshots. Subjects covered

include installation, the design and structure of the simulator, and some very helpful tips for getting the best from Combat Aces.

There's no shortage of historical background notes, and plenty of data for each of the aircraft you can fly. Although useful for putting each aircraft into historical perspective, some of us would prefer more information on how best to fly each aircraft within the simulation, and perhaps some tactics for deploying each aircraft to its best advantage. Those not used to flying this kind of aircraft



The Airco D.H.2 - Lanoe-Hawker and Gwilym Lewis were numbered among its pilots

Fokker DVII with the markings of Willi Gabriel



might find this a help in getting to grips with the handling of the planes and the skills required for aerial combat.

Installation is painless, and the Combat Aces icon on the desktop leads you to three choices of terrain texture to fly over: summer (green fields), winter (white textures) or the default terrain that comes with the host simulation. Once you arrive at the main menu, the first thing you notice is that the backdrop illustrations are still those to be found in the original Combat Flight Simulator. This struck us as being a little strange, and can burst the immersion bubble until you get into your chosen plane. Flight mode can be selected from the usual options; Free Flight, where you fly unopposed, is a good way of getting a feel for these canvas, wood and wire machines. Quick Combat lets you see how each aircraft compares with the next, and Single Mission allows you to fly any of the 70 available missions in whatever order you fancy. Finally, there's the full-blown Campaign option.

English or German? Sopwith or Fokker?

There are six campaign types, three Allied and three German. For the Allies they consist of a 20-mission campaign covering the whole war, five Flight Training missions, and finally a ten-mission campaign involving the defence of London, flown mainly at night. If you join forces with the opposition, the structure of the German campaign is exactly the same, except that the final ten-mission campaign involves you flying as the Red Baron. Your goal as the legendary ace is to survive all ten of the missions. All the missions in Combat Aces vary, from dawn patrols escorting reconnaissance aircraft to the

pursuit of Zeppelins at night before they have a chance to bomb London. The briefings are easy to follow, and provide some helpful tips for achieving your goals. The campaigns are structured

chronologically, which gives you the opportunity to fly a variety of aircraft. You're spoilt for choice - take a look at the complete list.

Ace Graphics?

How do they measure up against their real-life counterparts? After referring to a few photographs, it's obvious that Alpha Simulations have done their homework and produced a set of aircraft that look the part in both internal and external views. The instrument panels, for example, are the best representations of WWI cockpits yet seen in any flight simulator. According to the developers, each panel was hand-drawn from photographs, although they admit that a certain degree of artistic licence was necessary. Although not all the cockpits can be 100% accurate, each is still a well-detailed representation of the real thing. It should also be noted that many pilots 'customised' their 'offices' and so cockpits could vary in layout between aircraft in the same squadron.

Externally, WWI aircraft were generally more colourful than those used in later wars, particularly those fighting on the German side, and Alpha Simulations has gone to great lengths to replicate the finish of the originals. Markings are based on real aircraft; the Fokker DVII, for instance, is painted in the colours of Vizefeldwebel Willi Gabriel, a flamboyant German pilot with 11 kills to his name. Some things jar, such as the oversized 'lozenge' camouflage on the German Fokker DVII, and you might expect some of the colours to be a

little more muted - minor points when compared with the amount of detail that has been lavished on each of the aircraft and their panels.

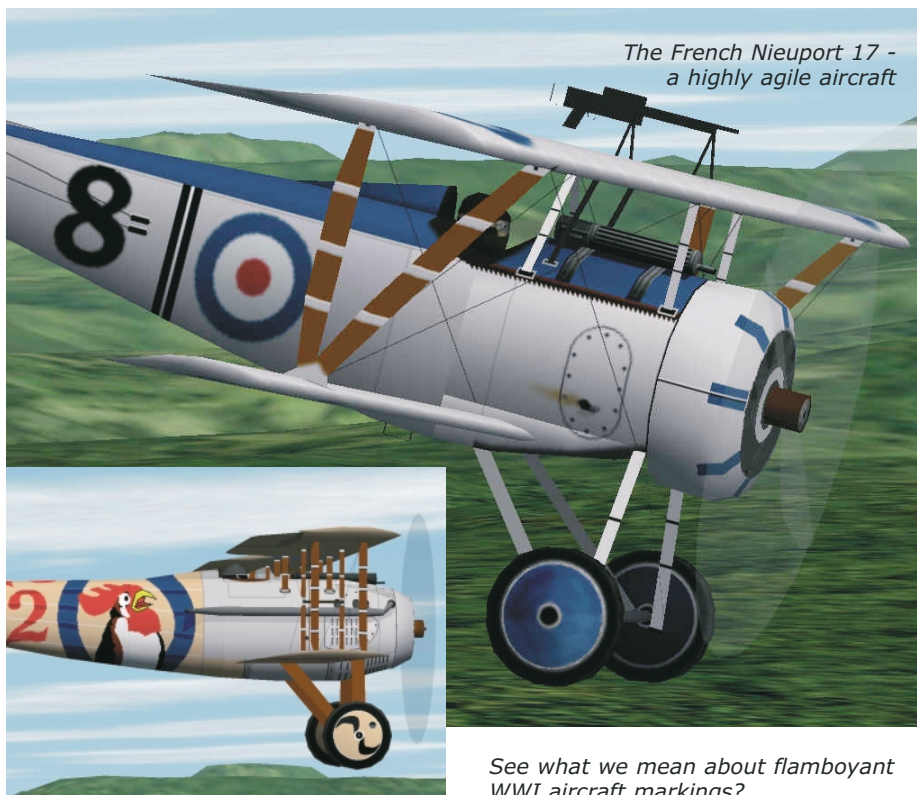
In the landscape graphics we find detailed aerodromes complete with static parked aircraft, hangars, and trees, but the surrounding terrain is relatively bare, with little to get excited about. This is understandable, given the sustained bombardment unleashed on much of the countryside. WWI aerodromes were normally built near towns, but this isn't the case in Combat Aces. Still, it could be argued that this expansion is more about dogfighting, where your attention should be focussed on what's happening in the upper atmosphere.

Heavy Noses and Sore Arms

It's worth pointing out that the version of Combat Aces we used for review had a patch downloaded from the developer's website at www.alphasim.co.uk. This remedies problems with frame rates, collision detection, and crashes when landing away from your home airfield. It's a worthwhile download, as it really does improve the quality of the flying experience.

Dogfighting is a lot of fun in this type of aircraft, where combat skills (particularly energy management) and aerial performance mean the difference between success and failure. For the most part, these planes didn't have an excess of power, so every time you lose energy in a manoeuvre you have to try and regain it, either by levelling out, or by diving if you've got enough height.

One feature that isn't modelled in Combat Aces is the variable handling of most WWI fighter aircraft when they were leaving the ground and landing. Because the weight of the fuel load affected their centre of gravity, they were tail-heavy on take-off, and nose-heavy on landing once the fuel had been



The French Nieuport 17 - a highly agile aircraft

See what we mean about flamboyant WWI aircraft markings?



You want to be the rear gunner of this Bristol F.2B? Just press button 2 on your joystick



Close encounters of the biplane kind - A Fokker DVII duels with an S.E.5A



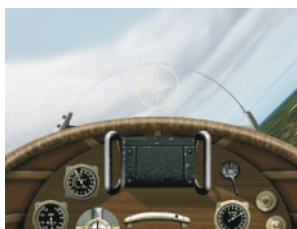
Simulated version of the Sopwith Camel is complete with 'lively' flight characteristics



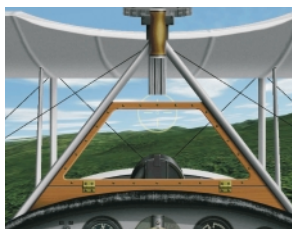
The Siemens-Schuckert DIII had an amazing rate of climb



Gun breeches add to the realism of the Fokker DVII cockpit



Superb D.H.2 cockpit is particularly evocative of the period



The forward views in Combat Aces aren't confined just to the instrument panel

Flying by the seat of your pants

If you flew an aircraft that was powered by a rotary engine, such as the Sopwith Camel or the Nieuport 17, you'd be affected by fumes from the burning of the castor oil that was used in the engine. Total-loss lubrication meant that oil was being regularly chucked out into the slipstream and towards the cockpit. The effect on the pilot from ingesting large quantities of castor oil would be the same as if he'd taken a dose of laxatives. So, the first thing many a pilot did on landing was to take a trip to the toilet. Camel pilots were always recognised by the oily shoulders of their flying coats, caused by having to lean around the Camel's hump into the oily slipstream to see forward. They were probably also quite fleet of foot!



Lean out for a dose of castor oil!

The Combat Aces selection



Avro 504C
Avro 504K
Bristol F.2B
Airco D.H.2
Handley Page O/400
Nieuport 17
RAF S.E.5A
Sopwith Camel
Sopwith Triplane
Spad S VII



Albatros DVa
Fokker EIII Eindecker
Fokker DVII
Fokker DVIII
Fokker Dr.1 Triplane
The Red Baron's Triplane
Halberstadt CL II
Siemens-Schuckert D III
Zeppelin Airship
Zeppelin Staaken R.VI

Gwilym H. Lewis DFC – The Ace I Knew



There are probably only a handful of WWI veterans left alive and any first-hand account of the Great War is something to preserve for posterity. Patrick Downie was fortunate enough to know Gwilym Lewis and he told us a bit about his acquaintance with one of the last of the Aces.

*Some years ago I came across a book called *Wings Over The Somme*, a collection of letters written by a WWI Ace with 12 kills to his name, Gwilym Lewis. His book opened the door to the world of the great pioneers of aerial combat. These were men who had neither manuals nor training in the theories of dogfighting, purely because they hadn't yet been written. In this respect the Great War was essentially a time of discovery and experimentation. Gwilym was born in 1897 and qualified for his aviator's certificate in 1915. He was then posted to France with 32 Squadron at the age of 18 to fly the de Havilland D.H.2, a single-seater pusher biplane with the engine mounted behind the pilot. He eventually returned to England to do a stint as an instructor, and finished the war with 40 Squadron as a Flight Commander, flying the S.E.5A. He also served in WWII as a staff officer.*

I actually had the good fortune to meet the great man himself, at a club for those interested in WWI aviation called Cross and Cockade. Myself and many others used to listen in awe as he recounted his exploits and, in spite of his advancing age, his mind was as alert as the youngest of his audience. He knew men like Edward 'Mick' Mannock, flew against Richthofen's Flying Circus, and always had the utmost respect for the enemy and particularly the capabilities of their

aircraft. I remember him once saying how the Fokker D.VIIs were formidable, particularly with their ability to 'hang' on their propellers at low speeds and shoot at British aircraft from below.

*On one occasion he invited me to his house after I had asked him to sign my copy of *Wings Over the Somme*. The one thing I remember about the visit was that he still had the struts and wooden propeller from his WWI S.E.5A hanging on the wall of his study. The struts had distinctive black and white stripes painted on them, and Gwilym actually had his own personal aircraft, which he called *Artful Dodger*, a name that was painted on the front of his S.E.5A. Sadly, Gwilym died in 1996, but I will always cherish the fact that I finally met a living legend who actually flew and fought in WWI.*



Gwilym's S.E.5A 'Artful Dodger'

consumed. This tendency was particularly noticeable on the Sopwith Camel. You'll find, however, that the Combat Aces aircraft tend to be nose-heavy no matter how much fuel is being carried. One solution we found, to add to the realism, is to trim your plane to be tail-heavy, either with the trim wheel, if your joystick has one, or by a couple of taps on the [1] key on the numeric keypad.

Camel pilots always complained about having sore arms whenever they flew, because they were constantly holding the stick forward, not having the luxury of trim levers in those days. Aircraft such as the Sopwith Camel and the Fokker Dr.I were equipped with rotary engines, where the whole engine rotates around the crankshaft, and so you'll notice the torque effect the engine and the propeller have on the direction of flight. On take-off your aircraft will veer to the left, so you'll have to apply right rudder. In addition, the nose of these aircraft will want to rise in a left hand turn and will fall when turning to the right. A novel feature included in Combat Aces, incidentally, is that whenever you bank the aircraft the pilot moves his head in the direction of the turn.

The AI (Artificial Intelligence) is generally superb, but friendly and enemy aircraft have a tendency to crash into the ground during low-level flight. This is because they're supposed to be flying things like

Zeros and P-47s (in Combat Flight Simulator 2), and so they keep stalling their 'underpowered' WWI aircraft. There's not much you can do about this, outside of re-programming Combat Flight Simulator 2, but at least it explains the problem. There's obviously no radio communication, as the only form of communication between aircraft at the time was through hand signals or flares, but you'll notice that your wingmen do react to the Attack command, and will break off to engage the enemy. Some missions are virtually impossible to complete successfully because of the gap in technology between your aircraft and that of the opposing side. This is particularly relevant if you are flying for the British in certain months, namely the first half of 1917. This mirrors history perfectly - April that year came to be known as 'Bloody April' by the RFC.

The action doesn't just encompass dogfights. Many people don't realise that strategic bombing came of age during WWI, but this important aspect of the war in the air has not been forgotten in Combat Aces. With a Handley Page 0/400, Zeppelin Staaken and Zeppelin Airship, there's scope for wreaking havoc on the ground as well as in the air.


All things considered, Combat Aces is a great expansion and it illustrates what it's possible to achieve with the Combat Flight Simulator 2 platform. There's even

expansions for the expansion with other aircraft that can be downloaded (for about a fiver each) from the Alpha Simulations website (www.alphasim.co.uk). If dogfighting, defending, observing, bombing or just flying some excellent aircraft appeals to you, then you'll have a job tearing yourself away from Combat Aces.

Patrick Downie



Note the correct 'Greek' rather than 'Maltese' crosses on Richthofen's Triplane – the authenticity is brilliant!

REVIEW SCORE: 				
Publisher:		Just Flight	Price:	£24.99
Developer:		Alpha Simulations	Release Date:	Out now
Website:		www.justflight.com		
At a glance: Great interior and exterior graphics, and intelligent missions. The few negatives such as the spartan terrain pale into insignificance when the package is viewed as a whole. Highly recommended for dogfighting aficionados.				
SYSTEM REQUIREMENTS: PII 300MHz, 64Mb RAM, 3D graphics card				
RECOMMENDED: PIII 450MHz, 128Mb RAM, 16Mb 3D graphics card, 3D sound card				

Altitude: 60.5 miles at 164

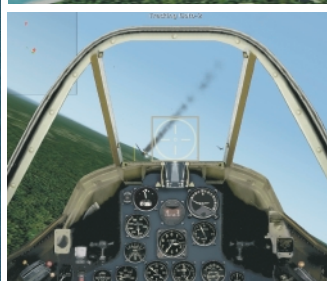


What if... they'd found the cruiser

Don't let the film put you off!



Battleship Row



The P-40's virtual cockpit



Or fixed, if you prefer

Pearl Harbor

Flight One's latest Pearl Harbor package comes complete with 16 missions (eight for the US, and eight for the Imperial Japanese Navy), and includes the most detailed Curtis P-40B you are likely to find anywhere. There is also a free upgrade campaign available to download and an AI Catalina and a B-17 also make an appearance.

Installation is straightforward, whether you download the software and then obtain the key, or buy the boxed version, published over here by Just Flight. The detailed HTML manual includes mission overviews, information on the types of aircraft you'll encounter, and Pearl Harbor memorabilia...right down to aerial reconnaissance photos!

The beautiful P-40 was built by Roger Dial and Steve Small. We've flown some of Roger's previous aircraft, including the P-51 and P-47, and the new Warhawk measures up well. The flight model is outstanding; stalls are nasty but recovery is possible, and the roll rate is very quick. The P-40 has plenty of solid hitting power against the IJN aircraft. One of the most pleasing features is the panel, and its fully

operating custom gauges. We tend not to use the virtual cockpit in all Combat Flight Simulator 2 aircraft, but this one is excellent. The fuselage textures are also impressive, as is the sound (developed by Mike Hambly), and the damage modelling is superbly detailed.

The scenery included in the package adds additional details around Pearl and Hawaii, including some new textures to simulate docks and residential areas. The airfields, including amongst others Wheeler, Hickam, and Haleiwa, are also embellished with additional buildings...which the Admiral Tojo and his boys will target unless you're very, very fast. We didn't have any problems with frame rates at 1024x768 and 32-colour depth on our 1GHz system with 512 Mb RAM and a GeForce 2 board. A new upgrade of the default clouds, optimized for Combat Flight Simulator 2, is included in the package. It makes customising the clouds a little quicker, but otherwise we didn't notice a very great difference in their appearance.

You can access the campaign mode by downloading the 1Mb update or, alternatively, simply bring up the Single Mission menu and work your way down

the list (the missions are the same). The first four missions are based on historical scenarios, and the latter four on fantasy scenarios in which you can personally alter the course of history. What if the US Navy found the Japanese first? How would you react if you were in the air when the Vals rolled in? What if you were flying escort for the B-17 flight?

You rarely take off alone, and your wingman is there to assist you. Don't forget to give him the attack order with the [A] key, and tell him to [R] rejoin when he's finished. Use [SHIFT/CTRL/L] to get rid of the icons for a cleaner screen. Watch out for the Abes! The Gotos aren't as skilled, but they have rear gunners who'll target you and their slow speed makes it easy to overshoot. It's a target-rich environment, and if you happen to make five kills, you can join the ranks of the virtual Aces. Avoid flying in a straight line for too long, and your chances of survival will increase.

The Japanese missions allow bombing attacks on Pearl, strafing ground targets, and flying escort for the Vals. The A6M2 Zero is the default Combat Flight Simulator 2 model, and while not a tough aircraft, she'll turn on a sixpence.

You won't be disappointed with Pearl Harbor. It's entertaining, a real challenge, and the inclusion of the 'what-if' elements adds an extra dimension to the historical basis.

Leonard Hjalmarson



Mission Briefing – rewrite history



On the tail of a Goto in the P-40

REVIEW SCORE: 			
Publisher:	Just Flight	Price:	£24.99
Developer:	Flight One Software	Release Date:	Out now
Website:	www.justflight.com		
At a glance: A good value package with a detailed P-40 Warhawk, 16 missions in total plus a campaign, and you can fly for both sides. It's time Hollywood approached Flight One for ideas; they might get a few more Oscars.			
SYSTEM REQUIREMENTS: PIII 300MHz, 32Mb RAM, 3D graphics card			
RECOMMENDED: PIII 400MHz, 64Mb RAM, 16Mb 3D graphics card			

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GREATEST AIRLINERS: 737-400

Since its launch in 1967, the Boeing 737 family of airliners is one of the most widely used regional commercial airliners in service. The original 737 model, the 100, is a testament to the longevity and endurance of this line of aircraft, because NASA still uses them. Given its widespread popularity within commercial aviation, any of the 737 family would make a perfect add-on for Flight Simulator 2000. You'll find a default 737-400 in the original program, but there's certainly some room for improvement. With this in

mind, DreamFleet and Flight One have brought us Greatest Airliners: 737-400, which is published in Europe by Just Flight.

You may know of DreamFleet from their numerous freeware panels, but this is their first fully commercial add-on. Recently, we've seen several expansions, such as Phoenix Simulations' 747-400, that have focused primarily on one aircraft, allowing the designers to put all of their attention into one lovingly crafted design. It's a far cry from the days all those years ago (well, about two, actually) when

A Beautiful Boeing Baby

you could buy 250 different aircraft for 25 quid. The question we have to answer is: does this tight focus on detail result in a product that's worth your hard-earned money?

The first thing you should do before flying is, of course, read the manual (although we don't always practise what we preach!) There's an 80-page printed manual in this European version that covers everything from what all the buttons on the panels do, to getting started, getting complicated, and finally, a tutorial written by Marcos Arranz, a real first officer on 737-400s.





As 'photo' realistic as it gets

The manual also includes several touches of humour, which shows it never takes itself too seriously, something we found quite refreshing. There's a further 200-page supplement in PDF format on the CD that should be enough to satisfy your curiosity about the 737-400 and also while away a few long winter evenings. We normally wouldn't bother going into so much detail about manuals, but there's been much debate on the subject lately and the switch to DVD packaging for most software in the UK means that printed manuals will soon become a thing of the past. It looks like a good time to buy shares in a printer cartridge company!

When you first enter the flight deck of the 737-400, you'll immediately notice the sheer clarity and intricacy of the cockpit instrument panel. DreamFleet's noted attention to detail is certainly not lost and this is one of the most beautiful panels we've seen. There are different ways to design an aircraft panel for Flight Simulator, and DreamFleet's method is to

use extremely high quality digital photographs and then position the gauges in them accordingly. Alternatively, you can draw the complete panel as a piece of 'artwork' and then position the gauges. The latter approach has been dismissed as the 'Warner Brothers Method' because it gives rise to (in the words of an anonymous developer) 'cartoon panels'. Both approaches have their merits and it really boils down to which you prefer. However, there's no denying that the cockpit of this aircraft looks impressive. The front panel is just the beginning of the graphical treat, but graphics alone do not make a good aircraft. The success or failure of any Flight Simulator add-on can rest on how well the plane and its included graphics integrate with the program itself. In this regard, the 737-400 presented here does quite well. The buttons and switches on the panels all work as they should and we could find no discrepancy between a button and its described action.

The two most important additions to this new digital cockpit are the EADI (Electronic Altitude Direction Indicator), which is the main component of the EFIS (Electronic Flight Instrument System). These two LCD screens on the main panel put all altitude and navigational information into one combined panel. The EFIS can display ILS information, navigational information such as waypoint data, and more. These displays are meant to reduce the workload of the pilots while still displaying all the information needed to fly the plane. Many modern airliners include similar displays in their cockpits, which is why, for example, the crew of the 737-400 has shrunk from three to two.

Along with the standard front panel views there are also pretty (but not much use for flying) passenger views, including 'over the wing' and 'seat' views that again show off the attention to detail that DreamFleet has put into this plane. The control surfaces on the wings, however, don't move when in the passenger views. In the cockpit, besides



The FMC pops up ready for use...



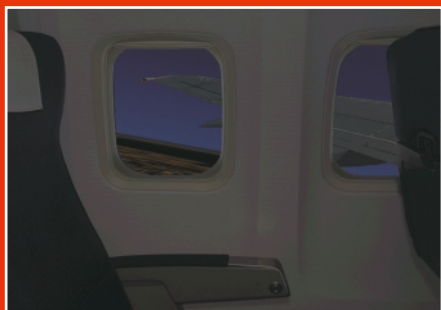
...It works, too!



No sign of Bugs Bunny or a cartoon panel!



The night views are impressive



Would you like the window seat?



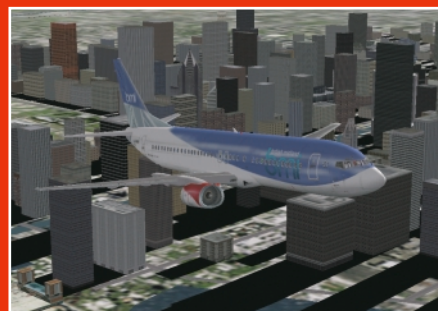
The crew – faces that only a mother could love!



You can see the sun going down like thunder over China 'cross the bay



"Reports of a downturn in passenger numbers are unfounded," said a spokesman



"Chicago, Chicago – that toddlin' town!"

The 737-400, like most of Boeing's commercial airliners, is just part of the whole story. The 737, as a series, is as successful a line of aircraft as they come. The original 737 (the 100 model) was launched in 1965, and is still being used by NASA today. Since its original launch, the 737 has seen several enhancements, leading up to the latest model, the 737-900, the first of which was delivered this year.

Over four thousand 737s are in use today, the most numerous being the classic 737-200, which was produced between 1966 and 1988. The current models, the 737-300 through 500, have all seen improvements in carrying capacity, range, power, and technology. The newest 737s include the 600 through 900 models, each model denoting increased power and carrying capacity.

The latest 737s will also incorporate optional winglets into their design. Winglets will allow to them to fly more efficiently by causing less drag, allowing for more efficient fuel consumption and power usage. Overall, the 737 is probably one of the most popular and easily recognizable planes in its class and for short to medium range flights it has few equals.



the standard front view, are several centrally aligned views, including the throttle quadrant, the landing gear quadrant, the centre console (for communications and trim), and the overhead panel. One can almost control the entire plane from these panels, and they each include several lighting settings.

Once a visual inspection around the plane has been completed, it's time to take off and see how it flies. The 737-400 was tested on several flights, ranging from short regional flights (which is what it's designed for), to much longer, cross-country and transatlantic flights. During these tests, the 737-400 behaved properly, and felt accurate in terms of flight modelling. The controls are fairly responsive, which is correct, given the size of this machine. The included avionics also make navigating and landing much easier, thanks to a moving map display and integrated ILS, which are in the EFIS.

To add a little bit to the 'you're actually there' feeling, the 737-400 includes the AFAS (Automatic Flight Announcement System). This panel allows you to give the announcements that a real captain would make during a flight, such as departure information, warning of delays, and so on. The voice used sounds exactly like a typical airline captain, so it works well and adds to the feeling of immersion.

While one is flying the plane, several things become apparent. The first is the realism of the sound effects. They were recorded by the famous Mike Hambly (who doesn't live in Gibraltar), from a

real 737-400, so everything from the whine of the engines, to the familiar beeping from the announcement system, sounds as it should. The second thing you'll notice is how easy the aircraft is to fly. The 737 seems to be quite a stable machine, and only the slightest amount of trim was needed to keep it straight and level. Once you're comfortable you'll also notice how much fun it is to fly. While we were piloting the 737-400, the hours seemed to melt away, and we kept telling ourselves "...just one more flight."

The 737-400 package also includes three utilities, one of which, the FMC (Flight Management Computer), is integrated into the simulation itself. The FMC can be accessed by clicking on its picture in the cockpit, or running it separately. To the uninitiated this is a rather complicated piece of equipment, and some time should be invested in learning how to use it. Luckily, the FMC comes with a detailed help file, as well as three tutorials to get you started.

The 737-400 also includes a 'skinning' tool called the Text-o-Matic, which allows you to convert pre-made bitmap files into new liveries and colour schemes for the plane and then 'repaint' the aircraft. The Just Flight version comes with 30 different liveries, but you can create as many extra ones as you like. This will be a real boon for the virtual airline fraternity. Another handy utility is the Load Master Elite, which allows you to set the weight of your 737-400 by selecting loadouts of passengers and cargo.

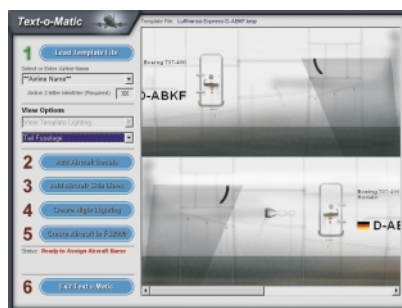
We could sing the praises of this excellent aircraft for many more pages, but not everything is wine and roses. We did encounter a few technical glitches, such as the cockpit voice warning system activating when switching from an external to an internal view. Flight Simulator 2000 also crashed a few times while we were flying and we think this may have been due to an inability to access a specific graphic. These random problems didn't ruin our overall enjoyment of the aircraft, but are worth pointing out. We should also point out that Just Flight have done their best to 'future-proof' the European release and they have promised to send purchasers a free CD-ROM if they want to upgrade their 737 to Flight Simulator 2002 when it becomes available.

Overall, Greatest Airliners: 737-400 is an excellent aircraft for virtual pilots to sink their teeth into. It's evident that a lot of care was put into this product and with the inclusion of the three utilities, this is a well-rounded commercial add-on with a free Flight Simulator 2002 patch in the pipeline. Although it doesn't include any other content such as adventures, it's comparable to other add-ons in this price range. We can safely say that if you're interested in this specific family of aircraft, you won't find a better treatment of it anywhere else.


Brian Rubin



Goodbye Seattle!



The Text-o-Matic in action

REVIEW SCORE:			
Publisher:	Just Flight	Price:	£24.99
Developer:	DreamFleet	Release Date:	Out now
Website:	www.justflight.com		
At a glance: While it's not perfect, this is probably the best virtual representation you'll find of this popular aircraft, and the Just Flight release comes with the added bonus of a paper manual and FS2002 compatibility upgrade.			
SYSTEM REQUIREMENTS: PII 400 MHz, 64 Mb RAM, 16 Mb 3D graphics card			
RECOMMENDED: PIII 750 MHz, 128 Mb RAM, 32Mb 3D graphics card			

Microsoft Train Simulator

No guns and no wings — but a re-creation of the authentic train experience without the need to fill your loft with rolling stock

A review of a train simulator in PC Pilot? Have we all lost the plot? Consider for a moment the essentials of the flight simulator experience. Objectively, we have cockpits, a realistic world environment, navigation requirements and systems to master. Subjectively, we experience a real sense of moving through a simulated world, the physics of weight and motion, the sound of wind and engines, and the raw beauty of the machine and the environment. These experiences are also common to Microsoft's new Train Simulator.

There is also something mystical about the sound of a train whistle floating through the fog in the morning light. Likewise, we've all shuddered at the power of tons of steel thundering past us while we wait at a crossing. Train Simulator recreates these experiences with a variety of engines on very differing routes.

Getting ready to roll

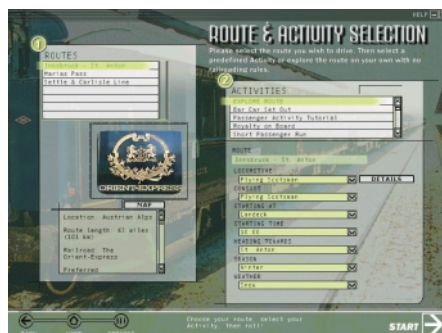
Installing Train Simulator couldn't be easier. The minimum installation is 500Mb, but if you want to load all the engines and routes to your hard drive, prepare to surrender 1.8Gb of space.



Driver's view leaning out — mind that tunnel

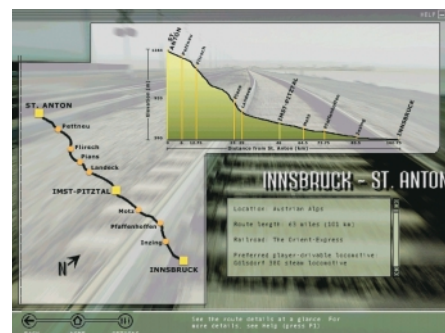


Another tunnel? Freud would have loved it



But will it leave on time? Better get a compensation form

There is no printed manual or jewel case, but on the CD you'll find two important files: a PDF file which is a key card, and a 4Mb Engineer's Manual, which also contains information about the Route Editor. The README file includes information on graphics hardware. After completing the installation, configure the graphics for your system. If you have a PIII 500MHz or better, and a GeForce2 graphics card, you'll want to run at least 800x600x32, and you can tweak many of the detail settings individually.



Route map with elevation details. No surprise that St. Anton's a ski resort

What is provided are tutorials, including voice-over, where you need to give correct responses in order to progress through the training session. The essentials are all here and will get you moving, or if you prefer, you can simply take an introductory ride.

When you're ready to roll, the choices are impressive. Train Simulator has six detailed train routes from around the world, all recreated with actual elevation and terrain data to mimic the real-world scenery, buildings and towns along the way. The array of available locomotives

ranges from the famous Flying Scotsman 4-6-2 steam locomotive to diesel-electric engines, electric railcars and the Amtrak Acela HHP-8 Express 'bullet train'. There are already many enhancements under construction by fans and third party developers – you can already download an F-7 add-on at www.3dtrains.com. New paint schemes are appearing at sites such as www.aluminumcloud.com, and Abacus has just announced TS Design Studio, the first Train Simulator-specific software for creating new engines, rolling stock and 3D scenery. Just Flight has created a Just Trains label (www.justtrains.net) and will soon be publishing an Activity Pack. Doubtless we will also be seeing a new version from Microsoft in due course. TS2003 might even be on the drawing board at this very moment!

Flying the locomotives

Thankfully the Flying Scotsman bridges the gap to flight simulation, at least metaphorically! Train Simulator can't be evaluated in traditional flight simulation terms, but we can assess the realism of the experience. The engines are modelled in superb detail; each cab is unique, and the gears, dials and levers all work as they should. Controls are operated via a mouse or by hot key. Consider the variety of locomotives...

The Acela Express is a high-speed unit. At each end of the train are the 6,000hp (4,600kW) locomotives with approximately six cars in-between (although you can add more in the Activity Editor). With this being a very modern machine, the computer controls almost make a driver redundant. Thundering along at 125mph, you'll see a lot of the world pass by.

Contrast that with the Flying Scotsman experience – if you take the engine out by itself, you might hit 90mph.

The experience is completely different; the chuff-chuff of the steam engine, the billowing smoke... It's a piece of history come to life. Lumbering up a pass at dawn in a light snowfall, we reach for our coffee mugs and are hypnotized by the beauty of the scenery.

The Scotsman is a challenge to operate, however, even with the assistance of the online help [F11]. You can take over the fireman's work, even to the extent of controlling the water injection, but you'll find yourself puzzling over the correct pressure to achieve, and it takes time to get the settings just right.

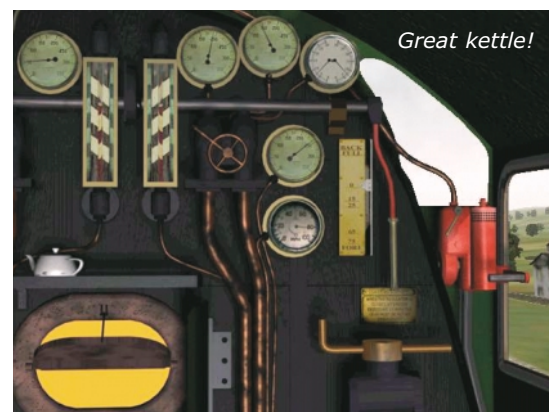
The basics are these: release the brakes, move the reverser forward, open the throttle regulator, and begin to move. You have to monitor your speed and throttle settings, and occasionally engage the brakes. [F4] pulls up the Track Monitor, telling you what the maximum speed is for any section of track, and warning you of imminent signals and restrictions.

As we worked our way through the various engines, certain things puzzled us. There's plenty of coal available on the Settle to Carlisle route, but water is hard to come by. According to the manual, you can scoop up water by activating a water scoop at certain locations, but we couldn't find either the locations, or a functioning water tower.

Marias Pass is a particularly spectacular pass through the Rocky Mountains. In Train Simulator you drive two different diesel-electric locomotives to deliver boxcars and haul freight through the mountains of Montana. The route stretches for 245 kilometres, and includes the natural wonders of Glacier National Park.



Flying Scotsman cab – a few less instruments than we're used to



Great kettle!

St. Anton to Innsbruck is an Austrian leg of the Orient Express route as it was in the late 1920s. As you pass through the Alps you'll want to experience both the driver function and the passenger position.

YOUR OWN ABC RAIL GUIDE

These are all the routes available at the moment, although the add-ons are probably only just round the corner (bend?)

U.S. Northeast Corridor (214 km)

Marias Pass in the U.S. and along the southern border of Glacier National Park in Montana (245 km)

Settle to Carlisle route in 1920s England (116km)

The Hisatsu line on Japan's southern island of Kyushu (86 km)

The Tokyo-Hakone route near Mt. Fuji (88 km)

The Innsbruck-St. Anton route in late 1920s Austria (101 km)



Dash 9 diesel-electric workhorse





The fun really begins here when you import an engine not designed for such a route (like the HHP-8 Express).

Views in Train Simulator are flexible, including all the standard view types. External views can be zoomed and panned, both vertically and horizontally. We particularly enjoy the 'fly-by' view, watching the train thunder towards us then zoom past. We were also impressed by the pan views while in the driving position – you can simply lean out of the window in the classic engineer's manner, or you can turn fully sideways and watch the scenery passing by.

We have commented on the scenic beauty of the simulation, and it really is spectacular. There's a variety of tree types, and plenty of weather effects, including sunshine, rain, and snow. Light sourcing and shadows provide that elusive sense of immersion in the simulated world. Sound is digitized samples from all the real engines and actions, and is of an extremely high quality. Every whistle, clack, and squeak is here. Furthermore, the sounds are unique to each locomotive and route, right down to cars honking their horns, and the whoosh of the air brakes when you start your run. Sounds are positional and Doppler effects are modelled.

Room for improvement?

There is no [PAUSE] key in Train Simulator, which makes setting up those photo sessions a challenge. More detailed route maps would improve the ease of performing activities such as taking on water and locating sidings. While the included Editor Utilities are very powerful, they are also complex – hopefully Microsoft will release a more user-friendly tool to edit routes. There are no people to be seen in the simulator, which will no doubt please some and infuriate others. Some of us would like to have seen a coal-



Operations notebook. No mention of ATC

begrimed stoker shovelling frantically to try and maintain speed (but our private lives are our own affair), or possibly somebody in an anorak clutching a notebook and pen at the end of a platform.

So what's it really like for us flight simulation fans to 'fly' the rails? There is certainly something calmly reassuring about the sound of a whistle and the clack of train wheels, and perhaps harried combat simulator enthusiasts might like to take a break from worrying about what's on their tail. If you have a love of detail, engineering, and forms of transport other than flying, there might well be something in Train Simulator to hold your interest – building a new route perhaps, repainting a classic engine, or possibly just getting involved in a slightly more relaxing kind of simulator. Might Austin Meyer be tempted to try his hand at developing X-Train? (Now that's something we would love to see!) What's certain is that Microsoft's Train Simulator is an outstanding first entry into a completely new arena. With no shortage of atmosphere, and plenty of challenges to be overcome, the sights and sounds of the railways have arrived on the PC in a well developed open architecture package. Expect enthusiasts and add-ons to appear in droves. ■

Leonard Hjalmarson

WHAT ELSE CAN YOU DO?

In flight simulation there's plenty to do, including navigating and following ATC instructions, but what about in Train Simulator? You can pick up cars, move switches, manage speed, and try different engines on different routes. You can also build your own routes and change paint schemes on the engines.

Basic activities are included with each route:

Explore Route: See the sights and explore danger zones.

Passenger (except Marias Pass): Drive a passenger train and make scheduled stops.

Road Freight (specific to Marias Pass): Deliver a freight train from one location to another.

Local Freight (specific to Marias Pass): Drive a freight train and make pickups and dropoffs at industrial complexes.

Yard Freight (specific to Marias Pass): Work as a yard mule.

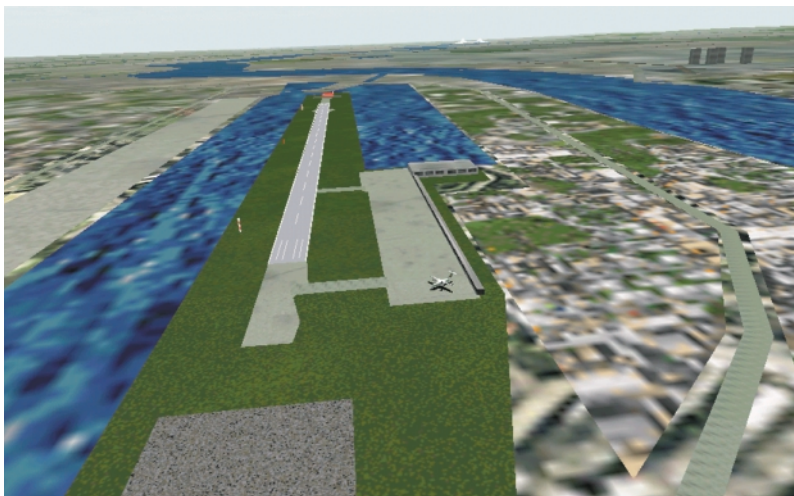
Player Created: You design your own activities using the included Activity Editor.

While performing each activity you are 'rated', or judged on your performance in areas such as operational procedures, timetable and work order compliance, adherence to speed limits, and basic train handling, which includes ensuring the comfort of your passengers.



Acela Express - electric elegance

REVIEW SCORE: 			
Publisher:	Microsoft	Price:	£49.99 (approx.)
Developer:	Kuju Entertainment	Release Date:	Out now
Website:	www.microsoft.com/games/trainsim		
At a glance: A beautifully designed simulator, which is sure to arouse a lot of interest. Impressively detailed, although probably lacking sufficient levels of user input to get flight simulator enthusiasts abandoning their cockpits.			
SYSTEM REQUIREMENTS: PII 400MHz, 128 Mb RAM, 8Mb graphics card			
RECOMMENDED: PIII 500MHz, 256 Mb RAM, 32Mb graphics card, sound card			



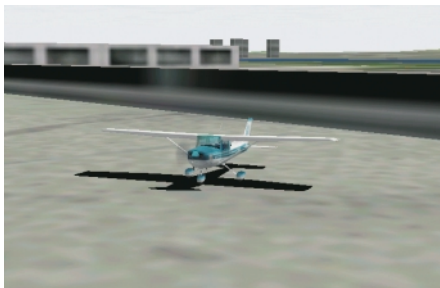
London City Airport before UK 2000 upgrade



Abracadabra! Sex In The City was never as good as this

UK 2000 London Airports Upgrade

London Pride



Clearly a simulator screenshot - a plane and some concrete



Same spot at City upgraded, but is it real or UK2000?



The world's busiest gets the Summons treatment

If you have already invested in the UK 2000 scenery, which includes Gatwick and Heathrow in immense detail, you will be delighted to learn that the unstoppable Gary Summons has already produced upgrades that he promises will be compatible with Flight Simulator 2002 when it finally arrives. His upgrade also includes three additional highly complex London airports - Stansted, Luton, and the London City Airport. Just take a look at the quality evident in the screenshots to whet your appetite, although it must be said that the previous visuals at Gatwick and Heathrow are hard to improve upon. In these two cases, the benefits of the upgrade are mainly noticeable in the greatly increased amount of dynamic scenery and extra aircraft.

All the buildings are painstakingly hand-designed from numerous photographs and videos taken on site by Gary himself. This means that any unusual and distinctive buildings, particularly those to be seen at Luton, are authentic down to the last brick.

If you use the CD version the scenery comes as a simple self-extracting installation. For those of you running an 800MHz machine, it is suggested that you have enough punch to load the 'Max'

option, which means 100 extra dynamic aircraft at both Gatwick and Heathrow! Our testing machine runs at 750MHz, but had no problems coping with the increased numbers, and a helpful inclusion on the CD-ROM is a freeware copy of FS Traffic, which controls all these extra aircraft. You come across a warning that FS Traffic, which really is well worth installing, may take up to 15 minutes to generate the new traffic, but it actually only took a very reasonable four minutes.


There's no shortage of impressive features on this upgrade, and a pleasing discovery is that all 36 air gates at Heathrow are included. Most of the empty stands are also provided with extra dynamic elements, such as a caterer's truck, which will pull up and load the food onto your Jumbo. The gates have working information boards for the pilots, as well as lights for docking, and other indicators. At Luton some of the stands even have moving stairs that dock with your aircraft at the same time as the catering truck arrives. Departure boards let you know how long you have to wait, and from time to time you'll notice lines of passengers queuing for boarding. Not only do dozens of aircraft at the terminals create greater realism, but they also take up

different positions depending on which day you're flying.

The price for the full download is £19.00 and a CD-ROM version is also available at £23.00. For existing customers who have purchased Heathrow and Gatwick (or Part 3, which contains Gatwick) then the discounted price is £14.00, or £18.00 for the CD-ROM version. You can order now at this secure site: www.uk2000scenery.bizland.com

Should you prefer to use mail order, an order form can be easily downloaded from the same site. If you want London for your flights and are going to upgrade to Flight Simulator 2002, then obtaining UK 2000 might be a capital idea!

Christopher Jarman

REVIEW SCORE: 			
Publisher:	Gary Summons	Price:	CD £23.00
Developer:	Gary Summons		Download £19.00
Release Date:	Out now		
Website:	www.uk2000scenery.bizland.com		
At a glance: A worthwhile add-on for any regular user of the London airports.			
SYSTEM REQUIREMENTS: PII 400MHz, 64Mb RAM, 3D graphics card			
RECOMMENDED: PIII 800MHz, 128Mb RAM, 32Mb 3D graphics card			

“Captain Speaking”



Welcome Aboard, Ladies and Gentlemen

There's no doubt that the power of modern computers has transformed our way of life, particularly in the sphere of leisure entertainment, where it allows us to go to places and to do things that would not be possible for us in the real world. As you all know, the field of flight simulation has developed to the point where the realism available today exceeds the level that just a few years ago was used to train real pilots, which brings us to the latest release from Just Flight. "Captain Speaking" is a new product developed for Flight Simulator 2000, providing realistic voice ATC combined with 37 new adventures, ranging from local hops to transatlantic marathons.

To begin the "Captain Speaking" experience, you have to load one of the situation flights, followed by the

associated adventure file. This will normally place you at the gate with your aircraft cold, ready to go through your pre-engine start-up checks. As the adventure begins you must choose your preferred airline (choices of which vary in the different adventures) and the language mode you want to use. You can choose between English, or the quaintly-named 'Foreign English' (English what am spoke with a foreign accent). If you choose Foreign English, for example, then the local traffic will sometimes speak in their native tongue, but the controller will always use English when calling you. Incidentally, the language options can be biased to cater for users whose first language is French or German. Unusually for this type of program, you can also choose a different aircraft to the default one.

As the adventure unfolds, you'll find that it follows closely the procedures used in real aviation, so you'll need a pen and paper to write down any instructions or frequencies transmitted to you, which can come thick and fast. If it all gets too much to grasp, though, you can always ask the controller to repeat the last call. Once the adventure is under way there is very little room for error, because ATC will assume you know what you're doing. Consequently all instructions have to be obeyed and acknowledged with a [Ctrl]/[Space] reply. Having said that, the authors have built in a facility for requesting level changes, and even different runways, provided that current weather conditions make such a change feasible.

"Le Capitaine Qui Parle"

We took a short trip across the Channel, courtesy of Just Flight, and chose the Paris Charles de Gaulle to Edinburgh adventure for our example flight. We used the default 737-400, mainly because this aircraft would be available to everyone. The route took us over the channel, up through the Midlands and on to Edinburgh - a fairly short journey of just over an hour, which is ideal to begin with.

After we logged in and listened to the ATIS, the controller cleared us for pushback and engine start, before handing us on to the tower for runway designation and take-off clearance. We were initially offered runway 09 for take-

off, but because this was at the other side of the airport we requested 08L, giving us less distance to taxi. After take-off we were given 1,400 feet, heading 334 towards the Abbeville VOR, then up to our cruise altitude of FL240.

The rest of the flight was uneventful enough until we reached the final leg, when we were informed that there was heavy traffic at Edinburgh, and asked to go into a holding pattern just past the Deans Cross VOR. Thankfully this is an automated procedure, and you simply have to wait for ATC to release you onto the final approach.

A few minutes later we were given the active runway (025) and ILS frequency, and told to reduce speed in the descent to 2,100 feet, ready to capture the ILS for finals. At this point the co-pilot reads the pre-landing checklist, the cabin crew run through the safety drill, and hopefully the aircraft rolls onto the runway heading exactly as planned. It was pleasing to see that the controller does not simply abandon you at this point, but continues to provide headings until you're established on the ILS. We completed the landing manually, and delivered our passengers to the gate a little later than planned, but all in one piece.



Loaded up and ready for a trip from Paris to Edinburgh



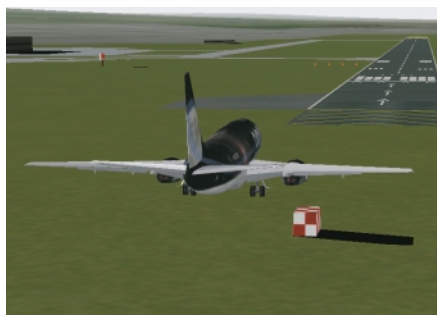
Is there any chance of another runway please?



Lining up on Runway 08L and ready to leave France



Now we're established on the ILS and looking good



And in we come to Runway 25 at Edinburgh



Down safe, if a little late – how realistic can you get?

This is the first system we've seen where the controller will occasionally ask you to deviate from your current heading for a 'radar check'. Then, a few minutes later, almost as if to prove that he's watching, he'll route you back on course again. You'll also find that the background 'chatter' uses the same controller, who issues typical instructions to other pilots in the same airspace. This is far more realistic than a selection of random sound files, using perhaps a dozen controllers spouting totally unrelated calls.

It's not easy to develop realistic ATC-based simulators because the programme needs to monitor a large number of variables at the same time. If you deviate too much from the accepted pattern, it must be able to notice this quickly and be able to respond appropriately - something of a nightmare for a programmer. Nevertheless, we found that "Captain

Speaking" managed to spot most of our intentional deviations and quickly offered a new correctional heading, except on one particular downwind leg, when we were distracted and forgot to turn on the base leg to capture the ILS. On this occasion the controller simply ignored us until we did a 360 back to the field and re-entered his operational area. This is quite an important feature because, when you first start to fly procedural approaches, it's very easy to get 'out of shape', and some programmes we've used seem unable to recover communication once it's been lost. Because the scenarios are essentially computer-generated, you can fly the same adventure over and over again. The flight conditions, instructions, approach procedures, and active runways will always be different.

"Captain Speaking" comes complete with a very comprehensive manual, but most

of it is in electronic document format on the CD. In order to use it all you have to print out a substantial number of pages, which is fine if you have a printer, but rather inconvenient if you don't. Nonetheless, it covers the methodology and facilities provided by the programme in great detail, with enough hints and tips to cover most eventualities.

Joe Lavery

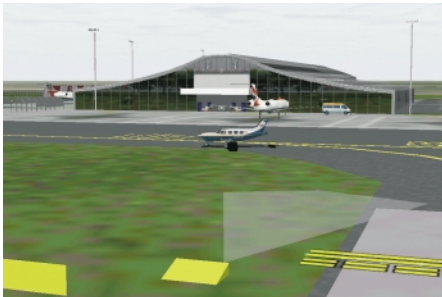
REVIEW SCORE: 			
Publisher:	Just Flight	Price:	£24.99
Developer:	Jean-Pierre Joyeux	Release Date:	Out now
Website:	www.justflight.com		
At a glance: A very well produced package that helps to create a realistic ATC environment, although you need a good command of IFR flight procedures to get the best from it.			
SYSTEM REQUIREMENTS: PII 400MHz, 64Mb RAM, sound card			
RECOMMENDED: PIII or Athlon 1000 MHz, 133 MHz Bus, 256Mb RAM, 32mb 3D graphics card, 3D sound card			

Great Britain and Ireland

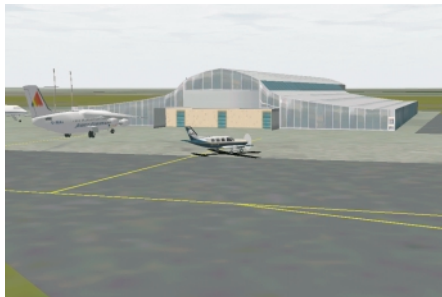
"This scepter'd isle, this throne of Kings"



Microsoft's sparse depiction of Southampton International



Southamton's new terminal from UK 2000 - far greater realism



Just Flight's new terminal - with even more detail

If you're going to continue using Flight Simulator 2000 for another year or two, and you haven't been upgrading your airports for free from the World Wide Wotsit, then this one is definitely for you. It contains over 280 detailed UK and Irish airports with an abundance of buildings and towers. These are a considerable improvement on the default airfields. Developed by the Ivanhoe Group and published by Just Flight, it includes a 64-page booklet in both English and German, with full installation instructions and operating manual. Full navigational data is provided for all the airfields.

Over 18 months of development went into the preparation and design of this expansion, and it certainly shows. While it would be unrealistic to expect the huge level of detail that is found in some of the specialist major airports packages, the large number of airfields provided here are very well fleshed-out indeed, as the screenshots demonstrate.

We have already amassed a good number of UK airfield add-ons, and so a few

comparisons are instructive. We may have to spend an inordinate amount of time in front of twin monitors, switching scenery buttons from one folder to another, and analysing screenshot details, but it really is the only method of arriving at realistic comparisons between products. To give an idea of comparative quality, we've taken a few shots from the default Microsoft airfields, Gary Summons' UK 2000 expansion, VFR UK Scenery, and the GB and Ireland disc under review.

First let's look at Southampton Airport. In our screenshots all the views are from the same spot. The default scenery only has the tower and runway, UK 2000 shows the new terminal building, and it's the same building in the screenshot from Just Flight's new CD, although you may not think so from its appearance! Our money would be on the UK 2000 version for accuracy, but the Great Britain and Ireland rendition has an air of glamour about it, and also adds a few more dynamic aircraft to the scene. If you study the comparisons of Newcastle Airport, we think you'll agree that the Just Flight offering wins every time.

The Just Flight crew say that there are a number of Easter eggs to be found on the CD, such as the London Eye and the Millennium Dome. Unfortunately we ended up having two domes when our UK 2000 scenery was also selected. Residents of Greenwich will probably be able to tell us which one is in the correct position.

The scenery is well detailed over a huge number of UK, Irish, and island airfields, and if you were looking to buy just one product to cover these areas, this is the one we would recommend for value and for the comprehensive scope of its coverage. ■

Christopher Jarman

REVIEW SCORE: 			
Publisher:	Just Flight	Price:	£24.99
Developer:	Ivanhoe Group	Release Date:	Out now
Website:	www.justflight.com		
At a glance: A comprehensive expansion with a pleasing level of detail and useful documentation. Great value at less than 10p per airport.			
SYSTEM REQUIREMENTS: PII 400MHz, 64Mb RAM, 3D graphics card			
RECOMMENDED: PIII 700MHz, 128Mb RAM, 32Mb 3D graphics card			



Newcastle as seen by Seattle; five out of ten for effort



Newcastle Airport from the UK VFR scenery - strange but true



Newcastle as seen by the Just Flight scenery builders. Impressive

Manchester International Airport — EGCC

Two runways are better than one at Manchester

The recent addition of a second runway at Manchester International Airport has been the latest step in the transformation of Ringway into one of the best and busiest airports in the UK. Unfortunately this has left those flying to this northern airport in their simulation world feeling a little left out. Worry no more, because SimFlyers Associated have produced an extremely accurate rendition of the airport for you to visit in your airliners and buzz in your Walter Extras.

The package is shareware, which is about a 4Mb download from the SimFlyers web site www.simflyers.net. Both the download and the installation were as flawless as they should be, and you will be ready to put Manchester on your itinerary faster than you can say "Doors to automatic and cross check".

Fly into the airport for the first time and you will find pretty much everything is there. Starting on the approach, you arrive down the new ILS, over a forest of lights on their proper steelwork, and doubtless touch down with perfect precision at the

aiming point. Taxiing to the apron you can follow the yellow lines past all of the accurately positioned and placarded holding points, towards the realistically located terminal buildings. You turn into the correctly numbered pier and use the indicators to position yourself accurately on the stand. Do the same thing at night and you will find the ground lighting systems accurately represented, in particular the green taxiway centre lights, which make finding your way around so much easier than the standard offering. Combine this with a Jeppesen airport plate and the marker boards, and you will find ground navigation a doddle by both day and night. The airport detail is good, but you seem to have to be a bit closer than normal for all the scenery to pop into view.

When downloading the software, you must remember to download the separate files for the static and the dynamic scenery. These bring the airport to life with planes



Manchester International Airport in standard guise



The updated airport

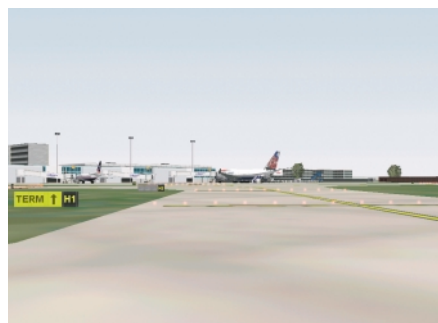
taxiing to and from the runways, and vehicles scooting about the place. You are also treated to arriving and departing aircraft, although you will have to turn your scenery to 'extremely dense' to see the dynamic and static scenery in all its glory.

It's clear that this is a very competent and accurate model of the new layout for Manchester International Airport - not quite perfect, but not far off. The penalty you pay for all this accuracy is, not surprisingly, frame rate. Running on a 933MHz machine, waiting at the threshold of runway 06L, the frame rate dropped from 36 frames per second down to 25 when the new airport was installed. It dropped further to about 19 frames per second once all the dynamic and static scenery was there too. The German Airports software reviewed some months ago offered eight airports for a shade under £20.00, whereas this is a single airport for about £10.00, however it's probably still money well spent if you fancy Manchester in your virtual world. ■

Stephen Heyworth



You are guided into the correct position at the gate to let your passengers off



If you get lost, follow the signs



Detailed approach lighting; one good reason not to fly too low on final approach

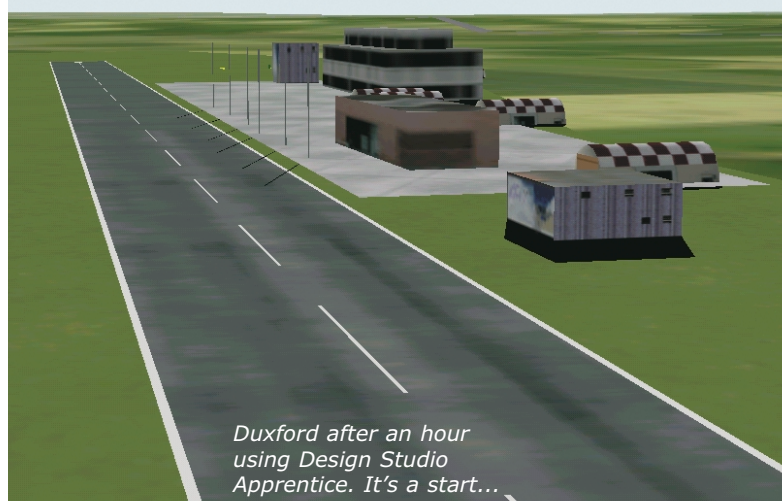


The terminal is both realistically portrayed and sensibly busy

REVIEW SCORE: 			
Publisher:	SimFlyers Associated	Price:	£10.00 approx.
Developer:	Ivanhoe Group	Release Date:	Out now
Website:	www.simflyers.net		
At a glance: A very competent update for Manchester International Airport, with particularly good ground detail and lighting, but probably not as good value as a commercial boxed product. Cut down demo available.			
SYSTEM REQUIREMENTS: PIII 500MHz, 64Mb RAM, 16Mb 3D graphics card			
RECOMMENDED: PIII 800MHz, 128Mb RAM, 32Mb 3D graphics card			



This is Duxford as it appears in Flight Simulator 2000's default world. It could be anywhere

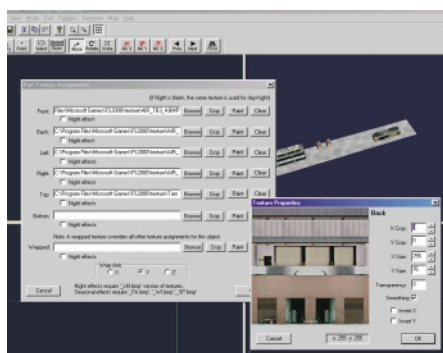


Duxford after an hour using Design Studio Apprentice. It's a start...

FS Design Studio Apprentice

Planning Permission Granted

In Issue 5 we had the pleasure of reviewing FS Design Studio Pro from Abacus, a brilliant utility for creating your own aircraft and scenery objects using a sophisticated 3D interface. You may recall that we had a stab at designing an airport, and followed it up in Issue 7 with a design for a small propeller-engined training aircraft.



You can accurately place your textures with the properties dialogue

Although the original Design Studio Pro is undeniably an excellent product, to use it fully requires an aptitude for design and, where airports are concerned, a fair knowledge of the structure of Flight Simulator 2000 as well. One of the few criticisms we made in the original review concerned the method used to get these masterpieces into your own scenery. This is easy if you're familiar with latitude and longitude or have previous experience of scenery design, but not so easy for the novice.

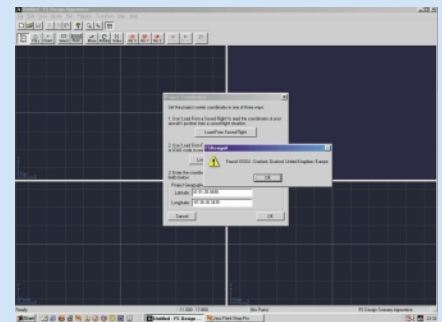
Well it seems that Abacus, or rather Louis Sinclair (the author), felt so too, because they've just released what amounts to a cut down version of Design Studio Pro, designated the FS Design Studio Apprentice. This is essentially the same product but without the ability to create your own objects from scratch. This particular facility is not a major issue, however, because the producers have provided a huge library of pre-defined

shapes and an equally extensive range of ready-made objects that you can drop straight into your simulated world. But hold on, there's more - the best part of this new and inexpensive package is the extra facility Louis has created for placing your objects both precisely and easily within Flight Simulator 2000.

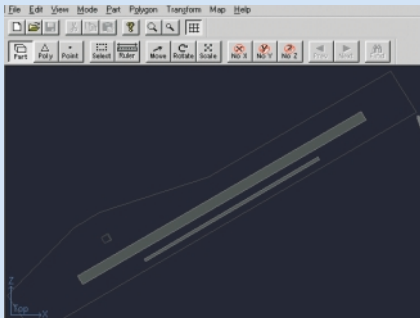
The idea is that you choose a location or airport from the scenery that exists on your own PC and point Design Studio Apprentice at it using one of the three methods provided. That's either by loading a previously saved Flight Simulator 2000 situation file, or by using the Load FS Facilities Database and entering an airport name or ICAO code. Alternatively, you can enter the exact latitude and longitude co-ordinates for the project's centre. The program will then create a detailed map of the area, so you can place your objects by sight straight onto a plan view of the physical area you're working on. This makes it so much

BUILDING AN AIRPORT

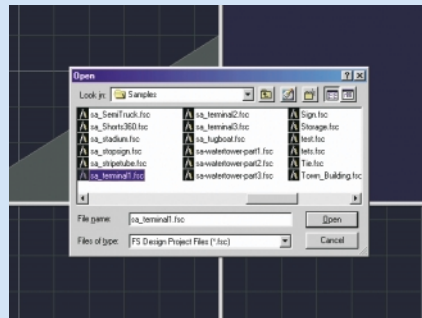
(the quick and easy way)



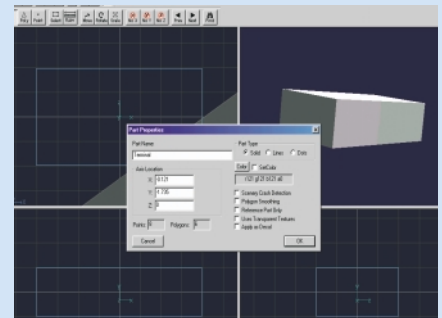
The Load area



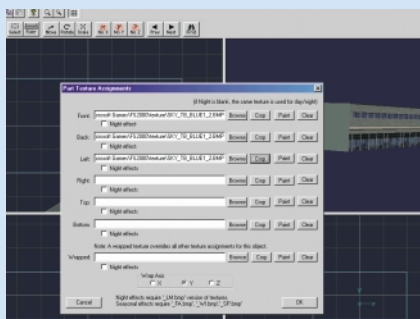
The map's loaded



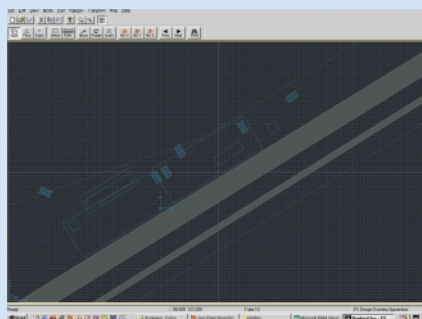
Now the object



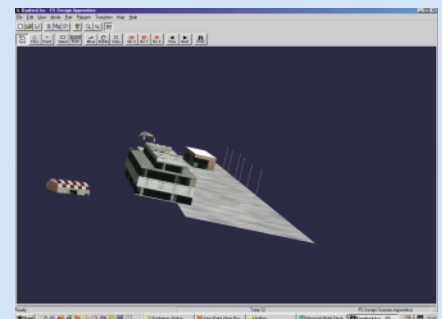
Import the object



Add the textures



Check out the view of Duxford



Working in 3D View

easier to visualise where things are in relation to each other.

To give it the ultimate test we decided to do a little world changing of our own, by adding a few buildings to one of the airports that Microsoft seem to have overlooked. Did we hear you say, "There's plenty of those to choose from"? So Duxford (EGSU), with its solitary tower,




Taxiing past the terminal at Duxford (PC Pilot version)

became the guinea pig, and apologies in advance to those who hail from that neck of the woods - it's not intended to look like the real Duxford.

We began with a terminal (of sorts) constructed from a basic building block, which was stretched and textured using one of the textures supplied in the main directory. If you can't find anything suitable then you can get some more samples from the Abacus site or, failing that, you can create your own with any bitmap editor. Check out our Design Studio painting tutorial in Issue 9. The other buildings were added in a similar fashion, and the resulting project saved as duxford.bgl in the main Flight Simulator scenery directory. When creating the .bgl file, the program sensibly prompts you to copy any textures used into the main texture directory, and that's it. Simply power up Flight Simulator 2000 and check out your new scenery.

Obviously we've used a fairly simple model to demonstrate how the program works, but if you have the time and the patience there's really no limit to the level of customisation you can achieve. The modelling tools, combined with the x, y and z tools, allow you to mould the basic parts into just about any shape you can imagine. Considering the low price of the package, it's worth having a go, if only to add your own house to the Flight Simulator 2000 landscape.

Joe Lavery

REVIEW SCORE: 		
Publisher:	Abacus	Price: £10.00 approx. (download)
Developer:	Louis Sinclair	Release Date: Out now
Website:	www.abacuspublish.com	
At a glance: This is a cut down version of the brilliant FS Design Studio Pro, intended for the occasional user who wants to make their favourite airports a little bit more interesting		
SYSTEM REQUIREMENTS: PIII 350MHz, 64Mb RAM, 3D graphics card		
RECOMMENDED: PIII or Athlon 1000MHz, 256Mb RAM, 32Mb 3D graphics card		

BACK TO BASICS

An in-depth look at flying the circuit

In the pursuit of excellence in any subject there comes a time when we need to return to the absolute basics. This may at first seem relevant only to those with limited experience, but understanding the fundamental principles of how to fly an aeroplane is not only vital for beginners, but also valuable for those who have spent many hours flying simulators, and are seeking a little more finesse in their flight.

For this purpose, we'll look at flying a light aircraft, such as the Cessna 182 or something smaller. Most student pilots start on something like a Cessna 152 or a Piper Tomahawk, which have a fixed pitch propeller, carburettor heat, and basic minimal instrumentation. Progression to more complex and IFR-equipped aircraft such as a Cessna 182 would usually only come after they were qualified.

Pre-Flight Checks

Having checked that there is sufficient oil and fuel, it's time for the internal pre-flight checks. These should be done before you start the engine, and cover a number of areas, but those important in flight simulation are:

- Parking brakes on – you don't want to move when the engine starts, especially at night when it can be hard to detect that you are moving.
- Controls full and free movement – move your joystick and pedals to their limits several times, checking that the control surfaces move. This will wake up your joystick and rudder, particularly if they are USB types.
- Trimmers full and free movement, and set to the take-off position – so that the plane is controllable when you take off.
- Throttle full and free movement, and set slightly open.
- Mixture rich; carburettor heat cold; master switches on.
- Flashing beacon on.
- Fuel tank on – switch to the emptiest tank.
- Fuel pump on – check the fuel pressure, then off. Only the

mechanical pump is used during engine start.

- Magnetos – keys in and start the engine.

As soon as the engine starts, you should check the following:

- RPM to 1,200 – the engine should not be revved higher until it has warmed up, and should not be left at low RPM in order to ensure proper lubrication.
- Oil pressure – rising to reach the green band within 30 seconds.
- Ammeter charging and suction registering.
- Magnetos – check for dead cut. Use the key to run the engine using just the left magneto, then both, and then just the right magneto. This is to ensure that either could run the engine in the event of one of them failing during the flight. Make sure you leave the magneto switch on

'both', which is normally the most clockwise position.

Now set your radios, change fuel tanks, and taxi out to the holding point.

At the Holding Point

There are several more checks to do on the way out and before take-off, which are mostly repeats of those already done, just to be sure. There are a few that you should do at the holding point, which are:

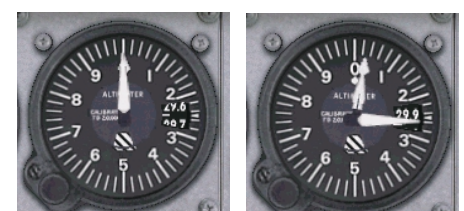
- Switch the fuel to both tanks, or leave it on the fullest tank if this is not possible.
- Check that the oil temperature and pressure are within limits.
- Set RPM to about 2,000, and recheck the magnetos (left, both, right, both).
- Turn on the pitot heat.
- Set flaps to take-off setting (typically none or the first stage).
- Set your altimeter, which usually means that:



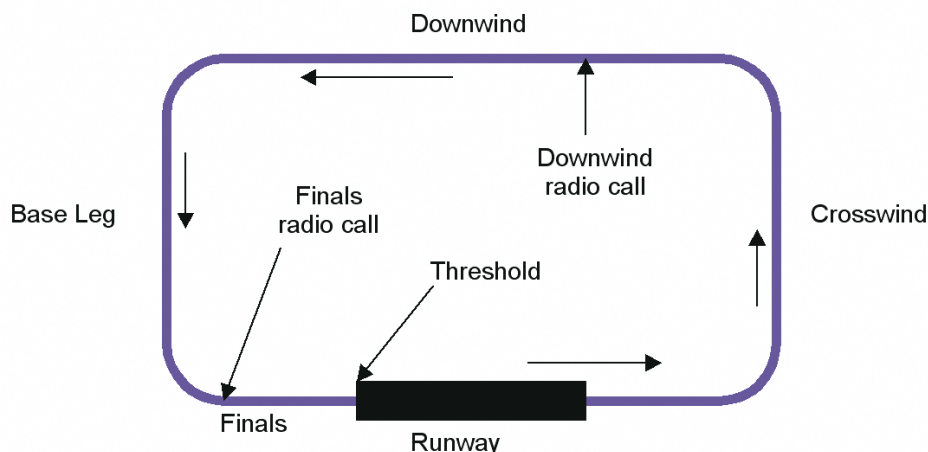
Basic plane, basic skills – both invaluable



Using pitch to control your speed. These are all at full power in a climb



Setting the altimeter to the QNH shows the height above sea level; the QFE shows the height above the aerodrome



The left hand circuit

(a) If you're flying away from the airport, to show the height above sea level, i.e. the airport altitude – it is probably showing this already and the pressure set is called your QNH.

(b) If you're flying very close to the airport or staying in the circuit, set your altitude to show zero. This will make it show your height above the airport. This is the QFE, so set this now.

Take-off

Now that all your checks have been completed, you're ready to take off. It's essential that you look to see that there isn't an aircraft about to land, and that the runway is clear. Despite getting a take-off clearance, the safety of the flight remains your responsibility. If everything is all right, line up and open the throttle smoothly and fully. You should keep the plane rolling straight along the centre of the runway, using the rudder. As you accelerate, you should check the RPM, oil pressure, and oil temperature to make sure they are all looking good.

There are two approaches to the take-off, and you can take your pick. Some pilots advocate easing back on the joystick well before take-off speed and allowing the plane to take to the air when it is ready. This can be a little tricky in a crosswind, when the plane tends to get blown sideways before it's ready to fly. Also, if your plane lacks power, you can end up skimming the runway in ground effect, never reaching more than about ten feet above the ground and not accelerating to climb speed. This technique is nevertheless very good for grass strips, where the nose wheel can be vulnerable to the bumpy surface.

The alternative technique is to decide on a good take-off speed and not rotate until you reach it. The take-off speed is usually to be found in the operating manual, but if you haven't got one, then using the start of the green arc on the ASI plus 20 knots is normally a good guide for a light aircraft. Once you reach this speed, pull back slowly and smoothly on the joystick and the miracle of flight will begin.

Flying the Circuit

Unfortunately there's no time to relax, as you're about to fly a circuit, and things are initially fairly intense. Your first task is to use the rudder to nail the slip indicator ball in the middle. The technique is to tread on the ball; if the ball is to the left, press the left rudder pedal. Many student pilots forget to check the slip indicator, and if you watch them taking off, you'll often see the plane curving slowly away from the extended runway centreline. This is just untidy in a typical well-behaved trainer, but will give huge handling problems in a more demanding aircraft such as the Tiger Moth.

Your second task is to sort out the climb speed, which is probably about ten knots above your take-off speed. The technique for doing this is one of the fundamental piloting skills. Without touching the throttle, control your speed by moving the joystick gently backwards or forwards. If the speed is too high, pull back a little to raise the nose gently skywards. If the speed is too low, ease forwards a little instead. This relationship between the pitch and the speed of the aircraft is fundamental to flying, and it must eventually become instinctive under almost every circumstance. The effect is the same as in a car or on a bicycle; when the hill you are climbing gets steeper, you slow down. The key to maintaining stable airspeed is to hold a steady pitch, only changing it slowly. If you 'chase the airspeed' you will over control, continually alternating between too fast and too slow. Smoothness is the essence of good flying.

Your final task in this initial stage of the flight is to adjust the trim so that the aircraft pitch doesn't change when you take your hands off the joystick. This takes a lot of practice to do well in a real aircraft, and is sadly impossible in many otherwise excellent PC-based flight simulators, largely because it's not possible to make sufficiently fine trim adjustments. You should nevertheless aim to get the trim as good as possible, especially during climbs and descents, when the glitch is less apparent than it is in level flight.

When you reach 200 feet above the runway (QFE), check that the engine is still behaving by scanning all the engine instruments, in particular the oil temperature and pressure. If you have any flaps dangling, now is the time to retract them, but be careful to control your airspeed. In a simple aircraft such as a Cessna 152, you can now take a brief breather. If you're flying something a bit more sophisticated, reduce the throttle, then the RPM, and then the mixture, to the climb setting. This order of doing things is vital to prevent potential damage to the engine. The settings would normally be taken from the aircraft flight manual, but

as a guide for a normally aspirated (non-supercharged) aircraft, a setting of 24 inches manifold and 2,400 RPM is appropriate. For a gentler climb use 23 inches and 2,300 RPM. This parity between the manifold pressure and engine RPM is referred to as having them 'boxed'. Using too high a manifold pressure with a low RPM is similar to being in too low a gear in a car, and can put excessive stress on the engine, hence this order of setting them. You must have all of this done by 500 feet QFE when you turn crosswind, and it will take a little practice to get everything done in time.

Crosswind and Downwind Legs

There are two factors that define most circuits, their height and their 'handing'. The height is typically 1,000 feet QFE, and circuits are normally 'left hand'. Both of these vary depending on local requirements, such as the need to avoid flying over housing to one side of the runway, and the direction from which each aircraft arrives. A left hand circuit is one in which all turns are to the left. They are sensible because the captain sits on the left hand side of the aircraft, and therefore has a far better view out of the left hand window. So start your left turn onto the crosswind leg at 500 feet. Make sure that you use small control inputs, limit your bank angle to about 15 degrees, and keep that slip indicator ball smack in the middle.

When you're climbing slowly, you're asking the wing to work hard. Turning and rolling make it work even harder, and so over-enthusiasm in this climbing turn can push it past the stall limits, resulting in loss of control close to the ground and probable death, so it's generally disapproved of. You should stop your turn 90 degrees to the left

of the runway heading. If you took off from a runway, heading 050, for example, subtract 90 degrees from this to give 320 as your heading. Even this simple arithmetic can seem like solving a partial differential equation when you're trying to cope with everything else, so there's an alternative. Simply turn left until the runway heading appears at 3 o'clock on your Direction Indicator. Many DIs even have markers there to help you do this.

Continue your climb to circuit height and then level out, resetting the throttle, RPM, and mixture to keep your speed reasonable; a speed of 90 to 110 knots should suffice. As soon as you have the plane level, stabilised, and trimmed, you should start your turn onto the downwind leg of the circuit. Flying this way will automatically leave you about the right distance away from the runway. As you pass level with the downwind end of your runway, call the tower with "Golf Charlie Papa, left downwind three two", substituting your actual call sign and runway direction. The controller will respond with something like "Clear finals number three", meaning that you have permission to fly through to final approach, but there are two aircraft cleared onto finals before you. So start looking for them; the rule is "See and Avoid".

Keep your climbing turns to less than 15 degrees



This is where you should make your downwind radio call



Hold off the runway to be certain of landing gently on the main wheels

Pre-Landing Checks

Now for the pre-landing checks, which should be ingrained in your memory. Most checklists can be read, but this is the one you should know by heart. Say it as the word 'BUMPFICHH', which stands for:

Brakes – make sure they are released.

Undercarriage – lower your gear and check for the necessary three green lights confirming it is down and locked.

Mixture – fully rich; now is not the time to save fuel.

Pitch – fully fine for maximum power, just in case you can't land and need to go around again.

Fuel – check that you have enough to complete another circuit. Also select either the fullest tank, or both tanks if you can, and switch on your fuel pump. (If you are in the circuit, the fuel pump will probably be on already.)

Instruments – these should all show sensible readings, especially the engine instruments. Also check that your altimeter subscale is set to the QFE, so that the dial shows your height above the runway.

Carburettor heat – put it on for 30 seconds and then turn it off again, to clear any ice from the carburettor. Ice could freeze the throttle in a fixed position, which you definitely don't want when you're trying to land a plane.

Harness and Hatches – safety belts tight and doors locked closed. (Or the equivalent for a flight simulator: Can you reach your pedals properly and is your coffee well away from the joystick?)

Base Leg and Finals

By now you'll be ready to turn onto the base leg, but will need to determine whether you have flown far enough downwind. The way to do this is to look and see if the threshold is 45 degrees behind you, so select the rear-left view and check that the threshold is in the middle of your screen. When you are at, or past, this point, turn left 90 degrees again and then throttle fully back to idle. Your objective here is to hold your height until your airspeed has dropped into the white flap-limiting range. Many Cessna light aircraft allow the first stage of flaps to be lowered above this white arc, which is helpful for reducing speed faster. It is also

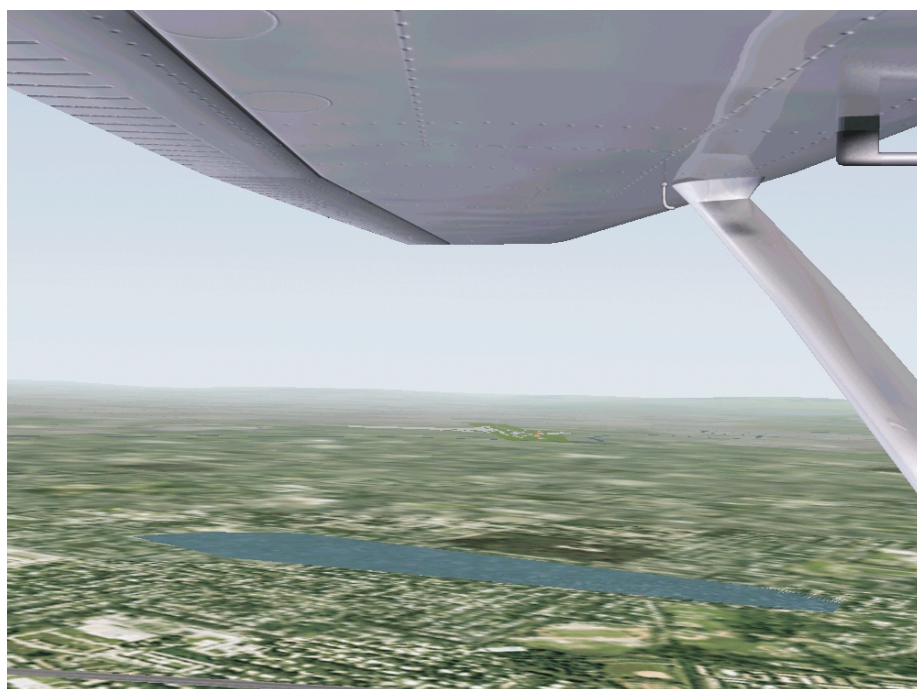
at this stage that you find out whether you were flying downwind much too fast. If you were, you may not have enough time to reduce speed. When your speed is in the white arc, you can start to descend. This is where another fundamental principle of flying becomes extremely important.

The principle is that during low-speed descents in a light aircraft, such as on base leg and final approach, you should control your height with the throttle, and then control your speed with the joystick. This seems the wrong way round, but the philosophy is based on sound engineering principles. In essence, your rate of descent is primarily dictated by your energy. You can only gain more energy from the engine, and hence the only way to slow your descent is to increase engine power. To demonstrate this, try the following exercise.

Fly towards an airport for landing, but make sure you are far too low. Cut the throttle and see if you can raise the nose and stretch your glide to reach the runway. What happens is that your airspeed drops. Slow flight gives low lift, so you continue to descend. Basically, there's not enough energy, and no matter what you do, you can't alter this fact. Now try the same thing but add power, holding your airspeed by changing the pitch of the aircraft, just as you did during the climb. This time reaching the runway is easy.

There is an added bonus when altering engine power. It alters the propeller wash (airflow) over the flapped central section of the wings, giving a direct change in lift. In more powerful light aircraft, both throttle and joystick have to be moved at the same time. The key to height control is that if you are too low, add power, and if you are too high, reduce power.

So when descending on your base leg, you may need to add a little throttle to ensure that you stay above the glide slope. Keep looking to your left, and as you approach the extended centreline of the runway, turn onto final approach. It's much harder to judge when to start this turn on a flight simulator than in a real aircraft, because of the limited views and the lack of peripheral vision. In the same way as when



Don't be afraid of extending the downwind leg to give you more time on finals

you were taking off, you're flying relatively slowly and the wing is working hard, so again a gentle turn and good speed control are vital, as is the need to keep the plane well balanced by treading on the slip ball. You should aim to be above 600 feet QFE at the end of the turn onto finals.

Now you're on final approach, call ATC with "Golf Charlie Papa, finals, touch and go", to gain your clearance to both land and take off again for another circuit. You now have a few more things to do. Throughout your approach, you must keep the plane on the extended centreline. It's much easier to stay on the centreline than

it is to regain it once you have lost it. Similarly you must stay on the glide slope using the throttle to control height, as described above. The next thing to do is quickly confirm that your mixture and propeller pitch levers are fully forwards, and that the undercarriage is down. These have only just been checked during your BUMPFICHH check, but they're critical for your safety, and this is a double check that has saved both embarrassment and lives. You also need to lower all the flaps one stage at a time, getting everything stable and trimmed between each stage. One of the beneficial effects of flaps is that they improve the view of the runway. Some

popular simulators give the impression that pilots are superheroes who can land planes without seeing the runway. This is nonsense for all but a few aerobatics planes and the likes of the Spirit of St Louis, where the problem is normally solved using a side-slipping approach. So if you can't see the runway threshold properly, adjust your view to make sure you can see it all the way down the approach.

As you fly down the final approach, your eyes should continually alternate between the view of the runway and the ASI (airspeed indicator). Your target speed should be given in the aircraft manual, but flying at 65 knots for trainer aircraft such as the Cessna 172 and Piper Tomahawk, and 75 knots for some of the higher performance light singles, should do the trick nicely. You should select a touchdown point a short way along the runway, and this point should remain at about the same place in your windscreen throughout the final leg. The picture you see of the runway should also remain constant in shape, and just get larger. If your aiming point starts to drop in the window, you are getting too high, so reduce the throttle slightly. Conversely, if the aiming point rises, add a little throttle. The important thing here is to make small power adjustments and to make them the instant you see things going wrong. You also need to maintain a constant speed to within a knot or two. This sounds difficult, but it is easily achieved by only making small and gentle adjustments to your pitch.

Landing

This steady and stable final approach configuration should be continued until you are almost on the ground. This is probably about twenty feet up, but if you're monitoring the altimeter or your ASI, you're looking in the wrong place, as your whole attention should now be focused on looking at the far end of the runway. At this stage you do two things at the same time – smoothly close the throttle, and start to ease back on the joystick. Your aim is now to 'round out', which means steadily raising the nose so that you end up flying the plane horizontally about 2 or 3 feet above the runway. Because you've removed the power and stopped your descent, you'll start to slow down and this means that you lose lift. The plane will start to sink, but you need to hold the aircraft off the runway as long as possible (well almost – you don't want to hit the tail on the ground).

As soon as you sense the plane starting to sink, pull back a tiny fraction more on the joystick to arrest the fall. Each time you do this, your nose will be slightly higher and the plane will be slightly closer to the runway. If you pull back a bit too much, you will balloon, with the plane climbing again. If it's a small balloon, simply hold



For glide approaches, stay high and leave your flaps up until you're certain you are going to make it



This is the right height to start rounding out; don't start too early



Once you're set up on finals, only make small adjustments

the joystick in a fixed position and wait for the plane to start descending again. If it's a big balloon, add some power, lower the nose, and start your flare again. If you rounded out a bit too high, pull back a little less on the joystick to let the plane sink slowly towards the runway. Keep repeating this until the nose of the aircraft is well above the horizon, and the plane is down to under one foot above the runway. This time let the plane settle onto the runway. You need to land on the main wheels first, and you're certain to do this if you flare the plane in this way. If at any stage everything starts to go horribly wrong, use full power and climb back into the circuit for another go.

You have now landed. You were cleared for a touch-and-go, so raise the flaps, reset the trim to the take-off position, and start the next circuit. Once you have mastered these circuits, try flying a few with the ASI hidden, and ideally with no instruments showing at all. This isn't as difficult as it sounds, and will train your eyes to pick up the signs which tell you what the plane is doing.

Crosswinds

Flying an aeroplane in a crosswind is no different to flying it in still conditions. The plane still handles in the same way, but there are some traps for the unwary. You'll have to allow for the wind in your circuit, so that you don't get blown too far off track. If the wind is from your right, turn right to compensate, and likewise turn left if the wind is coming from your left. To calculate how much to turn, take the crosswind component and divide it by two; so for a 10 knot crosswind from the left, turn 5 degrees left. This will work for most of the faster singles found in flight simulators, but allow a bit more than this for a slower plane. You'll have to adjust the start point of your turn onto final approach to allow for a wind either from behind or in front. Flying down the approach will need a little more power than usual, and the plane will not be pointing directly at the runway, but so long as you stay on the runway centreline and the glide slope, and you keep your speed constant, all will be well.

The area most likely to cause difficulties in a crosswind is the landing itself, in that



If you get low during finals, add some power

you will be flying sideways before the landing, and touching down like this is not good for the undercarriage. There are three potential solutions.

The crabbing method is the most popular. Down the approach, the plane has to be flown with the nose turned slightly into the wind, to keep it on the extended centreline of the runway. This crabbing is maintained throughout the flare until just before the wheels touch the ground, when the rudder is pressed to yaw the plane into line with the runway. The main difficulty with this technique arises when the rudder is applied too early. The reduced speed in the flare results in the plane being blown sideways before it touches down. This can only be prevented through practice. Twins and heavy jets have to be flown this way to prevent their engines or propellers touching the ground, although their undercarriage is more robust and they are often landed slightly sideways.

The wing down method is rarely used although it is always mentioned. So, for the sake of completeness: The short final stage of the approach is flown in a slight side-slip. Instead of pointing the nose into the wind to prevent drift, the into-wind wing is lowered and a turn prevented with the opposite rudder, effectively side-slipping the aircraft into wind, which keeps it on track. This wing down attitude is maintained right through the landing.

The third method is popular with many private pilots, and uses the best parts of the first two methods: The crab method is flown until the flare has been started. The plane is yawed earlier than normal, leaving it vulnerable to being blown sideways off the runway. As it starts to get blown sideways, the into-wind wing is lowered to prevent any sideways movement. This has the added benefit that you will now be side-slipping, which quickly places one tyre on the runway, further preventing drift. If the crosswind is from the right, for example, part of the way through the flare you would use the left rudder to straighten the plane, and use the right aileron to prevent sideways movement.



The view should stay the same all the way down final approach

Skill Consolidation

Once a student pilot has learnt to fly solo circuits, it is normally followed by hours of circuit bashing to hone these skills to perfection. To consolidate the learning and extend the skill, three other types of circuit are usually added into the routine.

Flapless approaches are flown, not surprisingly, with the flaps up. There are only three real differences to a standard circuit. The aircraft's nose will be slightly higher, the approach speed should be increased by about 10 knots to allow for the loss of lift, and the aircraft will float in the flare for much longer.

Short field approaches are almost the opposite. They are standard approaches flown slower than normal. In a light aircraft this typically means ten knots above the stall speed. At these low speeds, it can feel as if the plane is hanging on the throttle, because the effect of throttle on the sink rate is amplified. The cardinal sins are allowing yourself to sink too low on the approach, and chopping the throttle either too soon or too rapidly, which can result in a dangerously hard landing.

The final variation is a glide approach. Here a normal circuit is flown round to the base leg, but without descending. The pilot then selects a point from which he or she believes a landing can be made without the engine. The throttle is then closed and the pilot attempts to land the plane, which must be landed on the runway without further use of the engine. Add significant crosswinds and headwinds if you want to make this a real challenge.

Circuits are vitally important in the skill of flying because they contain so many facets of flying in a short space of time. Take-off, climbing, cruise, descent and landing are all covered. Master the different types of circuits and you have mastered the major elements of aircraft control. If you find them difficult, review the major points in this article and persevere. If you find them easy, relocate to Netherthorpe EGNF, and try the different circuits there. After a few hours of practice, you'll find that circuits don't seem so busy or hectic after all, and you'll be a much better pilot. ■

Stephen Heyworth



Flight Sim Toolkit



The Things Dreams Are Made Of

I bought my first computer in 1989, an Amiga 500, and it opened up a whole new world of flight simulators. The problem was that they always tended to be based on aircraft other than those that I really wanted to fly. Then, in 1993 Domark produced Flight Sim Toolkit. It was developed by Simis, specialists in standalone flight simulators such as the MiG 29 and VGA Harrier. The strongest features of their simulators were the realism of the flight models and the visual edge they had over much of the competition. Simis were the first to bring 640x480 full-screen flight simulators to the desktop, and with the introduction of Flight Sim Toolkit, enthusiasts were no longer totally reliant on commercial products. Now they could create the simulations of their dreams on an ordinary PC at home, and design almost any kind of fixed wing flight simulator they wanted.

"We'll leave all the details up to you..."

I had always wanted to build simulations of aircraft that nobody really wanted to cover commercially and now I could. What's more, Flight Sim Toolkit would allow me to create any kind of terrain I wanted, from flat deserts and gently rolling hills to mountains and canyons. Cockpits could be produced with comprehensive ranges of instruments, all of which would

interact with the simulated world to produce a high degree of realism. I'd certainly not consider myself to be a programmer, and the wonder of Flight Sim Toolkit is that it contains a whole suite of tools that work under Windows to cover every aspect of simulator creation. The front end is the Project Editor; this allows you to select terrain tiles and colour palettes, as well as being a simple link to the other five modules of the program. As these all work under Windows, it's easy to swap between them so that you can attend simultaneously to all aspects of the simulator, and the only problem is running it to see how it looks. Because Flight Sim Toolkit is vintage 1993 software, simulations ideally need to be run in its natural environment of DOS, but fortunately everything works fine under Windows 95/98, albeit without sound.

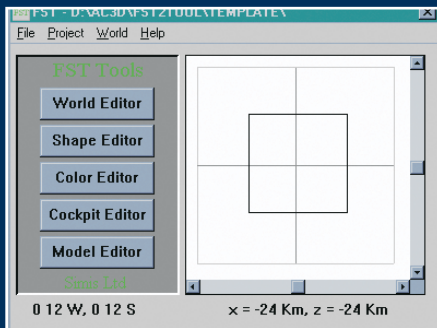
When designing a simulator it's always difficult to think up a good idea for a scenario on which to base it, in terms of era, location, and so forth. In my Jaguar GR1 Strike Force Delta Zulu, the idea was that following the end of the Cold War, the Soviets invited an RAF Jaguar squadron over to a remote training area deep within Russia, to participate in a series of 'friendly' war games. As I had no 3D model of the Jaguar, I needed to design one. I was already familiar with the Shape Editor, but to a newcomer this module is particularly difficult to master, as it obliges you to learn by trial and error.

I usually produce a drawing on graph paper to compare with my shape as it appears on the Shape Editor grid, and start by producing a fuselage cross section and extruding it to the desired shape.

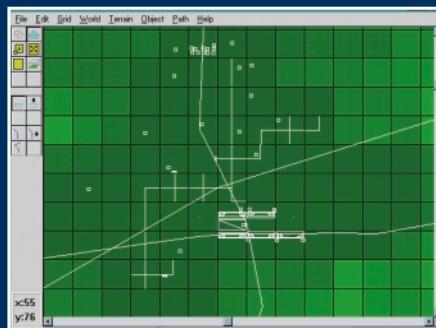
All the shapes in the Jaguar are relatively simple, but getting them to work properly in the simulator can be quite tricky, because of a phenomenon known to users as 'burn through'. This means that unless polygons are perfectly flat, they appear to blink on and off. What's more, each shape needs to have different levels of detail to reduce the polygon count the further away the shape gets from the viewer, thus helping the simulator to run at a good frame rate. This can be done in the Shape Editor, and I usually add about five levels for each shape unless they are very simple.

"You may run into a few surprises on the ground..."

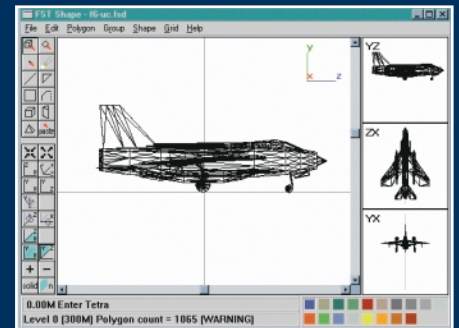
This process is continued until I have enough shapes to start populating my world, and can then open the World Editor to begin creating terrain. The terrain in Jaguar is fictitious, although some of the Flight Sim Toolkit community do produce some extremely useful shareware and freeware tools, one of which will convert a picture into a series of terrain tiles. When the landscape is satisfactorily adorned with hills, rivers, and lakes, other features can be added. I usually add my main airbase first, then



Project Editor - You'll only be limited by the size of your imagination



World Editor creates and edits terrain, allows placement of all object types, manipulation of properties, and object travel paths



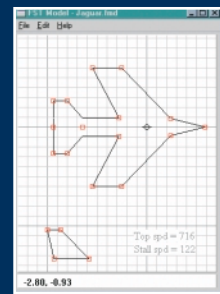
Shape Editor designs and creates all 3D shapes, such as aircraft, vehicles, towns and base facilities



Colour Editor produces a complete colour scheme for all aspects of the simulation



Cockpit Editor creates a complete cockpit instrument suite, to be overlaid onto the cockpit image file



Model Editor creates the simulator's aerodynamic flight model, based on power, weight, wing efficiency, and other relevant factors

add towns, roads, bridges, fighting units, and navigation aids.

Flight Sim Toolkit lets you add features called hangars and depots. The hangars house aircraft, and land or sea vehicles come from the depots. Both can be tagged as either Red or Blue Team. This allows the addition of any number of paths for shapes to follow, and lets you set them as either friend or foe. If an aircraft is following a path and detects an enemy within 30 miles, it breaks free from its path and attacks it. This is where the dogfighting element of Flight Sim Toolkit comes in.

"Specialised aircraft will be required..."

All the aircraft can have their own flight model created in the Model Editor, which calculates the flight characteristics based on shape, thrust, weight, and other user-definable elements. You then assign the flight model to the shape coming from the hangar. The depots work in a similar way, but send out land vehicles, and you can also set them up to send out aircraft to taxi around the airbase. Creating ships is especially entertaining as you can then carry out missions to track down vessels at sea. A variety of ground defences can also be produced with various adjustments, such as rate of fire and range for the guns, and target detection height and destructive power for the missiles.

The Cockpit Editor lets you import a picture of a cockpit, either in the form of a photo or a rendered 3D illustration, to act as your visual link with the outside world. The bitmap needs to be in PCx format, 640x480 pixels, and ideally in 16 colours. This may not seem like many, but it works surprisingly well. If you're ambitious, a 256-colour version can be used, but it can produce some unusual effects on the colour scheme, as it uses some elements of the palettes normally reserved for the glowing colours used for gunfire, the sun and explosions. This image is then imported into the Editor and embellished with all the instruments and gauges you might want. It then gets assigned to the aircraft in the World Editor to produce a complete plane ready for flight.

"And your mission is..."

So far we just have the bare bones of a full simulation, which won't be complete until it's got a series of missions and a front end. For this I use an old DOS multimedia authoring tool called Neobook Pro, which allows me to run batch files from within the front end to give that professional appearance. The later version of Jaguar uses different colour schemes and cockpits, to give the illusion of different times of the day or a view through night vision goggles.

"You'll have a full backup team..."

Since its very earliest days, Flight Sim Toolkit has inspired many enthusiasts to become members of user groups. The most active is the Flight Sim Toolkit Mail List at Yahoo! Groups, and the most complete related website is currently www.flightsimtoolkit.co.uk. This contains the most incredible collection of tools, updates, features for simulators, and upgrades, as well as documentation, news, and a complete worldwide listing of all active Flight Sim Toolkit developers. There's an .avi of the Jaguar sim in action on the cover CD and for more information it's worth a visit to www.groundzero-simulations.co.uk and www.theunderdogs.org

It is rare to find any piece of software still in daily use after eight years, particularly gaming software which usually has a shelf life calculated in weeks, but Flight Sim Toolkit stimulates your creativity to the point where its users can put into practice all their ideas for simulations. With a little practice, patience, and inspiration, you too could be producing highly respectable flight simulators to rival many past commercial titles. They'll only take up a couple of megabytes of disk space and give you enormous pleasure not only from flying them, but also from building them from scratch!

Ron Walker

Flying in the Hyper Lobby

An Me-410 Hornisse on your tail means trouble



Dial-a-dogfight!

Way back in the dim and distant past, when Noah was a sailor... well, it was actually in Issue 8 (copies still on sale), we included a feature on the online squadrons that flew on Jane's Combat Net. The squadrons were made up from like-minded fans of the Jane's series and their online combat was hosted by an Electronic Arts server. If you've never dabbled in online flying, then you're missing out. As well as having some RI (Real Intelligence) opponents and wingmen, it's also quite a good social event, as you can chat with your squadron partners using Game Voice software.

However, shortly before penning his piece for PC Pilot, Ade Pitman of JG27 wrote to tell us that Electronic Arts had pulled the plug on their server. We wrote to EA on behalf of the Jane's community to ask why they had taken this step and, lo and

behold, the server was reactivated. It's unlikely that the weight of a letter from PC Pilot actually caused them to put the plug back in and it was obvious that EA wouldn't support a flight simulation server for much longer, as it was a genre that they had abandoned. The boys at JG27 didn't fancy getting caught out again and squadron member Jiri Fojtasek, based in Slovakia, was working on his own online gaming system.

Goodbye Jane's - Hello Hyper

The Jane's net finally closed in May this year, but by that time Jiri's system, called the Hyper Lobby, was up and running. It provides a virtual area where members can meet up and fly together, and has support for a large variety of combat simulations, including Combat Flight Simulator 2 and now IL-2. You can even

fly using add-ons, and Ade Pitman recently gave Just Flight's Korean Combat Pilot a spin in the Hyper Lobby. The system doesn't copy software from any of the sims and you need the original CD installed before you can fly, so they're doing their bit to discourage piracy.

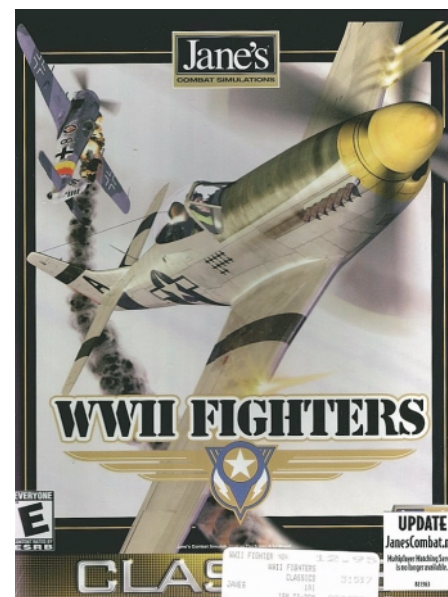
To find out how it all operated, PC Pilot took a trip down to Barry in South Wales, where Ade took us through the whole system. In order to get started you need a popular combat simulator (WWII Fighters, CFS2 etc.), and an Internet connection. Assuming your phone line is working properly, a 56k connection is fine, although if your going to get involved more deeply (and it's very addictive) an ADSL connection or cable modem is preferable. Once you're online, you can go to the Hyper Lobby site <http://hyperfighter.jinak.cz> and download

Getting Started

In the Hyper Lobby folder on our CD you'll find a README file and a zip folder called hlpro....zip. Copy this to your PC then unzip it. A shortcut will be created on your desktop. Connect to the Internet, click on the icon, make sure you've got your CDs handy and off you go. When the main screen opens you can select which Lobby you want to join. The list is quite comprehensive. Make sure you've got the relevant CD installed. If you wear an eye patch, sport a peg-leg and say "Ah-harr, Jim lad!" a lot, you'll be kicked out at this stage. Assuming you're above board, you then type in a call sign and password. You'll be asked to re-type it on the chat screen – make sure you click on the bottom of the screen when you type. Then you're in. You can see which pilots are in the Pilots Room before selecting a mission and getting involved. There's plenty of help

available on the website and beginners are always welcome.

For more information, check out the Hyper Lobby website at: <http://hyperfighter.jnak.cz>
Ade Pitman's site: <http://virtualdogfighter.co.uk>
or the JG27 site: <http://slver.homestead.com/jg27.html>



A US copy of WWII Fighters, showing the 'no online flying' sticker



It gets dark round here!



Props too slow? Then try an F-15



The JG27 website

a small file that sets up the Hyper Lobby on your PC (it's on this issue's cover CD as well). Once you've done that, you can log in and then select which combat program you'd like to fly. The system checks that you have the appropriate CD on your PC and then you go into an area that advises which pilots are up and flying around. You can then chat to the other flyers using voice software or type messages back and forth. The Lobby is monitored by squadron members to ensure that there's no bad language or other misbehaviour and the software is also smart enough to spot cheats who have altered the flight models of their aircraft. Spitfires that fly at 900mph are not welcome!

Synchronize Watches!

On a baking hot Friday afternoon, there were plenty of opponents and wingmen available in the Lobby, but Ade told us that it gets even busier towards evening, as flyers from across the Atlantic log on and start to provide cannon fodder for their more skilled European opponents. True enough, by about five o'clock the various arenas were teeming with pilots and we had some great fun being shot at by Aristo, Bauhaus and many others (the nicknames go with the territory!) We should admit at this point that ace flyer

'PC Pilot' (we couldn't think of a nickname) spent most of his time falling to earth by parachute, having been despatched by a US pilot who had just returned from a long night shift. Apparently it's all a matter of practice! You soon get the hang of flying in different international time zones and 4pm UK is about 9am in the western US, which all adds to the experience.

The team has some great plans for the Hyper Lobby and Jiri is currently working on support for IL-2. The only cloud on their horizon, as with any free service, is ensuring that they have enough bandwidth when it gets even more popular. We noticed recently that copies of WWII Fighters on sale in the US (it's no longer sold in the UK) have stickers on their boxes advising that online gaming is no longer supported. One entrepreneurial member of the Hyper Lobby spotted this and had some other stickers made up with the Hyper Lobby details on them that he passed on to shop owners. From a retailer's point of view, a box that says 'This feature doesn't work' might as well say 'Don't Buy', so being able to tell their customers that they can still fly these sims online is a real bonus.

The Hyper Lobby is currently hosted by a friend of Jiri's, but ideally they would like

to find a full-blown dedicated server to run the system. Unfortunately, this costs money and the answer may be to run on a fee-paying basis. However, they would prefer to run it for free and the news that Xicat have acquired the Jane's franchise might prove promising. Unfortunately, as soon as there's a sniff of a profit, the vultures begin to circle. While we were in the Lobby, Ade showed us a posting on a message board that alleged the Hyper Lobby was designed to invade your hard drive and remove all your personal details. It then suggested you visit an alternative site and do your flying there. We had to chuckle at this rather blatant piece of spoiling, especially as the Hyper Lobby is no more 'invasive' than any other website. There's no exchange of credit card details or personal information and it exists solely to provide an area for flight simulation enthusiasts to fly together.

So, what are you waiting for? You'll find the software on the current PC Pilot CD and there's a friendly bunch of flyers waiting to welcome you aboard. All we would ask is that someone gets up there and shoots down Aristo on behalf of PC Pilot. Vengeance is a dish best served cold!

Derek Smalls

World Flight 2001

Around the world for charity - the long way!

This November will see the start of the third annual World Flight event, when a group of flight simulator enthusiasts will fly around the world from the comfort of their own built-to-scale Boeing 757 cockpit, with a view to raising money for the BBC's Children In Need appeal. They raised £1700 in 1999, managed to double that figure last year, and are hoping to do even better on their global travels this time.

"I've got this really great idea..."

The project started when Daren Knightsbridge, inspired by his friend Lee James' earlier round-the-world charity flight, decided back in 1999 to use the idea to raise some funds for a deserving cause. He decided to do it in style, and set about recruiting a formidable team of cockpit builders and simulator specialists. First to get involved was Kevin Saker, whose expertise in cockpit development we featured in Issue 7, and the yokes and throttle systems which he designed and built are still in place for this year's event.

Back then the simulator was operating with Flight Simulator 98 and, after six months of hard work and frustration, the first World Flight finally got airborne, in spite of an exhausted Daren falling asleep in the cockpit the night before the start date, and delaying the initial departure by half an hour. Apart from the fragile physical state of some of the pilots and partial failure of the yokes, everything went largely according to plan and the team returned to Heathrow on schedule.

"How about trying this next time...?"

Armed with experience gained on a very steep learning curve, the team made some major improvements to the cockpit and systems for last year's event, notably the addition of some EPIC cards to take care of the switch circuits, and a custom avionics package. 2000 also saw an international element complementing the flight crew,

with a couple of pilots jetting in from across the Atlantic to take the controls for some of the flights. The start of World Flight 2000 was delayed for an hour, this time as a result of problems with one of the eight computers used in the flight, rather than chronic fatigue among team members. They were all doubtless inspired by the presence of BAA Heathrow's managing director, Roger Cato, who dropped in a couple of times to add his encouragement and check up on their flying skills. Roger is actually scheduled to do a bit of flying himself this year.

Some minor malfunctions in the ILS systems showed up as they reached New Zealand, but most of the time lost with delays was progressively clawed back so that the final landing back at London Heathrow was a mere hour late. The repeated success of their venture was confirmed not only by the considerable amount of money raised, but also by an award for their achievement presented to the team at the BAA annual staff conference.



Look out for this logo and dig deep!

"Has anyone ever flown into La Paz before...?"

At 1900 hours on 8 November an even more ambitious series of flights will begin, and this year's schedule is considerably more complex, starting with a short hop from Gatwick up to Manchester. Around 16 pilots will be visiting all five continents, and somewhere in the region of 30 different airports, including Bali, Darwin, Christmas Island, and La Paz in Bolivia. The simulator and cockpit have both undergone yet more development and, with an estimated 600 metres of wiring in the revamped simulator, the team will be glad to have some technical wizardry to call on from the engineer's post.



Photograph: Arthur Edwards

Daren's home contains some interesting features

WORLD FLIGHT WOULD LIKE TO THANK...



A word from our sponsors...

...and from these others!

Matthew Shiel, in his own 747-400 cockpit down under, will be joining in with his own flights on some of the same routes to raise money for the RFDS (Royal Flying Doctor Service), and World Flight's own crew of pilots in Surrey will include members from Canada and Denmark, and so is now a truly international outfit.

"Don't you know somebody who works for...?"

A vast number of companies and individuals have been kind enough to offer their help, not least with sponsorship for many aspects of this year's ambitious venture, from navigation charts and flight planning to in-flight meals and scenery add-ons. All of us here at PC Pilot are glad to add our support through sponsorship and by processing donations through our



They fly at night, too!

web site. If you want to help out financially (they're OK for pilots) nip over to www.pcpilot.net or www.world-flight.org and get out your credit card.



Pudsey, the Children in Need bear

"There's not much left to do then, is there...?"

The World Flight Organisation has clearly put in an astounding amount of work to make this event an even greater success than in previous years. It's a real pleasure to come across such a hugely dedicated and skilled team who have managed to turn their unflagging enthusiasm for flight simulation into an entertaining and worthwhile fund-raising fixture. They're expecting to end their marathon jaunt back at Heathrow at 1700 hours on 13 November, so let's hope that by then they've all had a great time and that the donations received will exceed even last year's impressive total.

At the time of writing, latest news from the World Flight website reports that test flights are going well as the departure date looms, and hopefully new batteries have been installed in all their alarm clocks. We wish all of them the very best for the trip, and look forward to reporting on their exploits soon. Keep an eye on their website for updates on their progress, and remember to pick up a virtual ticket as a means of helping along the donations. If there's a national coffee shortage by the time they've finished, you'll know who to blame!

Mark Embleton



Photograph: Arthur Edwards

Some of last year's World Flight team

Flight Sim Training

Professional instruction with Bill Stack



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BEFORE YOU START

A few prudent practices that professionals normally apply can make your flights as realistic as possible. The background will also help you enjoy flying while you learn.

OUR FLIGHT AND AIRPORTS

Today's tutorial will take us from Hartford, Connecticut, to Pittsfield, Massachusetts. Hartford is a large city on the northeast edge of the New York City metropolis. Pittsfield is a small town in the Berkshire mountains of western Massachusetts.

Three major features of today's flight will be mountain flying, the arrival at an airport with an elevation more than 1,100 feet (336 metres) higher than the origin airport, and use of a localizer-only approach. These conditions require close attention to our altimeter settings and altitudes.

OUR AIRCRAFT

We'll fly our Mooney Bravo again for this tutorial. It's an easy aircraft to fly and it gets us to our destinations in less time than the Cessna 182S. In the Bravo, this 50-mile flight will take about 20 to 25 minutes. You're welcome to fly this route in another aircraft type after flying it with us in the Bravo.

THE CHARTS

Be sure to familiarise yourself with the Jeppesen charts we will use for these tutorials before embarking on this flight, so you will know what to do aloft. These charts show the flight path, fixes and navigation aids. As well as the charts reproduced from the Jeppesen Sim Charts program that you'll see in this tutorial, we've included high resolution images of recent Jeppesen charts on the cover CD. For more information see page 11.

PROFESSIONAL FLIGHT PRACTICES

As usual, we steadfastly emphasize the need for following prudent aviation practices. Applying them or not can make the difference between a successful or failed flight.

USE FLIGHT PLANS

You are free to use paper plans or an electronic flight planner. Paper plans are a bit clumsy to make but easier to use aloft. Electronic plans are easy to make, but using them aloft requires following submenus that disrupt the simulation.

In lieu of filing your flight plan with ATC (air traffic control) as real pilots do, imagine that you have filed in accordance with regulations. Keep your flight plan handy throughout the flight so you can easily refer to it. After your flight, file it in a folder or loose-leaf notebook.

NOTE THE TIME

We always jot down the time of significant events during our flights, and we recommend your doing this, too. Note the time of take-off, the time of passing significant fixes and nav aids, and the time of arriving at the destination airport's instrument approach procedures.

COMPENSATE FOR WIND

Be sure to account for winds in your plan, because deviations from your desired course will consume additional fuel and delay your arrival. Our issue 4 tutorial explains wind compensation in detail.

MONITOR YOUR PROGRESS AND STATUS

Throughout your flight, check your instruments for the status of your aircraft and engine. Check your position frequently and also radio nav aids, time/speed/heading and/or GPS. Monitor your engine temperature, oil pressure, fuel flow and fuel supply gauges. Correct as necessary to maintain desired course, altitude and performance levels. At the end of the flight, compare your estimates to the actual performance in time and fuel consumption.

SIMULATE AIR TRAFFIC CONTROL

This tutorial across southern New England will take you through moderately travelled airspace to a medium-sized urban area, and you will land at a controlled airport. In lieu of ATC in your sim, remember that pilots must say when they're leaving an airport's airspace, when they enter an enroute airspace, and when they enter their destination airport's airspace.

FLY ONE STEP AT A TIME

While leaping over the basics and plunging into advanced flights is a great luxury of flight simulation, it is not realistic. Real pilots do not start at the end of the training course and work backwards, because it deprives them of the skills needed for meeting subsequent challenges. When flight simmers try to meet challenges for which they are unprepared, they frustrate themselves with poor performance and errors. So we strongly advise doing everything one step at a time and building your skills toward the next levels, just as real pilots do.

USE THESE TUTORIALS FOR FLIGHT-SIMMING ONLY

These tutorials are intended for computer flight simulation games, not for real-world aviation or real-world flight training. While making our tutorials as realistic as possible, we have adapted them out of necessity to the limits and nuances of flight simulation, so some aspects cannot and do not apply to real-world flight. Therefore, we caution everyone to use these tutorials for their intended purposes, and we accept no liability for anybody's misuse of them.

OUR AUTHORS

Bill Stack is an expert flight simmer and author of several popular flight sim books. Nels Anderson, our technical consultant, is a certified pilot and president of flightsim.com. Learn more about flying like a real pilot from Bill Stack's flight sim books at www.topskills.com/fltsim.htm or contact TopSkills in Tennessee on 865-584-7340.

MOUNTAIN FLYING

The small Berkshire Mountains of western Massachusetts are ideal for a first exposure to mountain flying. The highest (Mt. Greylock) is 2,613 feet (797 metres) high, and most of them are about 2,300 feet (700 metres) high. Pilots and simmers in other regions of the world will chuckle at our calling these peaks 'mountains' while locals will surely bristle at our calling them small. Three significant

aviation conditions must be considered: (1) We're landing at an airport about 1,200 feet (366 metres) higher than our origin airport. (2) We're landing at an airport surrounded by terrain at least 1,000 feet higher than the runways. (3) The forested and rugged terrain in the area can be hostile to lost pilots. As we learned from tutorial 12, using airports of differing elevations provides an

important flight challenge. We could crash into the ground short of the runway or approach too high for a safe landing if our altimeter was incorrect. To be sure the barometric pressure is different at both airports, we'll use different weather conditions at each airport. Remember that real-world pilots are confronted with this reality every day.

REFER TO OUR PRIOR TUTORIALS

For space considerations, we will not repeat common aspects in every tutorial. If you don't have our previous tutorials, back issues are available from PC Pilot – visit www.pcpilot.net. Issues 1, 2 and 3 are now sold out, but we've re-published them in CD format, together with Tutorials 1-8. This is great value with prices from £7.99. We'll be publishing further issues on CD as they sell out. For more details see our subscriptions page or the website.

- Issue 1** Taking off, flying straight and level, flying traffic pattern, landing, simple ILS approach. London City (circuit)
- Issue 2** Cross-country flight, VFR pilotage, IFR radio navigation, using SIDs, STARs, IAPs London City – London Stansted
- Issue 3** Attitude flying, VFR dead reckoning, IFR NDB Approach London Stansted - Birmingham
- Issue 4** Wind compensation, VFR with radio navigation, IFR VOR/DME approach Birmingham – Dublin

- Issue 5** VFR scenic coastal flight, IFR fixes, holds, procedure turn, ILS approach Dublin – Glasgow
- Issue 6** Night flying Glasgow – Manchester
- Issue 7** Global positioning system Manchester – London Heathrow
- Issue 8** Fuel calculation Heathrow – Cork
- Issue 9** Flying a back course – Hanscom to New Bedford
- Issue 10** LDA Approaches New Bedford to Brainard

- Issue 11** Using a DME-ARC Approach – Humberside to Norwich
- Issue 12** Using airports of differing elevations – Blackpool to Leeds-Bradford



FLIGHT SETUP

Prepare your simulator for your flight. It takes only a few minutes, and it makes your flight more challenging, more realistic and more fun.

SET UP YOUR WEATHER

On the August day we chose for this tutorial, New England was sweltering under a record-breaking heatwave. Temperatures approaching 100°F (37°C) together with high humidity were common for a few weeks. Combining high summer humidity with smog held in place by an upper level high-pressure dome reduces visibility to a few miles. Such oppressive weather diminishes aircraft and pilot performance alike. Pittsfield's being at a slightly higher elevation doesn't mitigate the oppressiveness.

Set your weather as shown in our weather tables. Later, you are welcome to use actual current conditions for this route.

Today's Weather at Hartford

Visibility: 5 miles
 Wind: 3 knots from 240 degrees
 Clouds: Cumulus, few 1/8 Ceiling 2,500 MSL, Top 4,500 MSL
 Precipitation: None
 Temperature, dew point at ground: 100°F/37°C, 70°F/27°C
 Temperature, dew point at 3,000: 87°F/30°C, 57°F/14°C
 Temperature, dew point at 6,000: 74°F/24°C, 44°F/6°C
 Temperature, dew point at 9,000: 61°F/16°C, 31°F/-1°C
 Pressure: 30.01

Today's Weather at Pittsfield

Visibility: 3 miles
 Wind: 2 knots from 240 degrees
 Clouds: Cumulus, few 1/8, Ceiling 2,000 MSL, Top 5,500 MSL
 Precipitation: None
 Temperature, dew point at ground: 95°F/35°C, 65°F/18°C
 Temperature, dew point at 3,000: 82°F/27°C, 52°F/10°C
 Temperature, dew point at 6,000: 69°F/21°C, 39°F/4°C
 Temperature, dew point at 9,000: 56°F/13°C, 26°F/-03°C
 Pressure: 29.99

Making this flight during daylight or night is your choice, because there is no practical difference for instrument flights. To fly at night, refer to our Issue 6 tutorial for details of

night flying. To make the flight a bit more interesting, try taking off before dusk or dawn so light conditions will change en route.

PREPARE YOUR AIRCRAFT

Be sure to prepare your aircraft for flight before taking off, by setting your radios and gauges and turning on your lights. The following conditions generally apply to most flights. For this flight, choose the Mooney Bravo, preferably the IFR version. All our time estimates are based on this aircraft. You are free to fly this tutorial in other aircraft later. Because the three-knot wind at Hartford is so slight, we can save ourselves a few minutes by taking off towards the north on runway 02, even though the 240 wind is from behind us. Start your flight at the take-off point of runway 02. Calculate your fuel needs and carry enough for this trip, using the aircraft's average fuel-flow rate plus legal requirements to determine the amount of fuel needed. Remember that our Mooney Bravo uses about 16.5 gallons of fuel per hour from take-off to landing, and we must include enough to reach an alternate airport and remain aloft for an additional 45 minutes. Our estimate is more than 20 gallons and less than 25 gallons. What's yours?

SET UP YOUR AIRCRAFT

Make your aircraft ready for your flight. 'Buy' enough fuel based on your fuel calculations. Your fuel mixture should be rich, and your propeller pitch should be low at these low altitudes. The cowl flaps should be fully open while on the ground and during take-off and climbout. The carburettor heat should be off, because it is not needed and its use will reduce performance. The pitot heat won't be needed unless the temperatures are below freezing and there's moisture in the air.

TUNE YOUR RADIOS

Although you can rely on your GPS for navigation, you still need your conventional radio nav aids for airport operations and as a backup during the en route portions. Set your Nav-1 and Nav-2 radios and your OBI for the first frequencies and radials you will use.

SET YOUR GPS

Engage your GPS by displaying it on your screen, then check the displayed course to be sure it reflects your desired flight path. Don't worry about SIDs, STARs or IAPs, because the

Microsoft GPS does not reflect them. Set the map for 'north up', 'course up' or 'track up', whichever you like best. As usual, pilots should know how to use the GPS devices in their simulators; that is, how to engage the devices, change view screens, select data and so forth. Read your manual for instructions.

SET YOUR GAUGES

As standard procedure, set your altimeter for local barometric pressure.

PREPARATION CHECKLIST

(This checklist is for these tutorials only, and is not intended to be complete.)

Aircraft Settings

Engine:	running
Fuel supply:	adequate
Fuel mixture:	richest
Propeller pitch:	highest
Cowl flaps::	open fully
Wing flaps:	10% (specified by Mooney)
Carburettor heat:	off
Pitot heat:	as needed
Rudder:	straight
Ailerons:	neutral
Elevator trim:	neutral

Gauges

Altimeter:	local pressure
Amperes:	neutral
Vacuum:	green
Oil pressure:	green
Fuel pressure:	24 psi (specified by Mooney)

Radios

Nav-1:	109.0 (Bradley BDL)
Nav-2:	109.0 (Bradley BDL)
ADF:	370 (Dalton DXT)
OBI-1:	006
OBI-2:	006
Com-1:	119.6 (Hartford Tower)

GPS

Map view:	on
Orientation:	as desired
Zoom level:	as appropriate
Plotted course:	as filed
Displayed:	as needed

Lights

Beacon:	ON
Strobe:	ON
Position (navigation):	ON
Landing:	ON
Taxi:	ON

Clock

Local time or your choice

IFR (Instrument Flight Rules) Tutorial *Part 13*

Three Peaks – approaching a mountain airport without a glide slope

This USA trip challenges us in three ways. It's the first mountain approach we've done, the destination is higher than the origin, and the instrument approach has an ILS localizer without a glide slope. With elevation differences, mountains around us, and no glide slope, we must be absolutely sure of what we're doing on this approach.

Between the origin airport in Hartford, Connecticut, to the destination airport in Pittsfield, Massachusetts we'll fly over busy Bradley International Airport, which serves the heavily populated metropolitan areas of Hartford, Connecticut, and Springfield, Massachusetts.

This short flight is only about 50 miles and should take about 25 minutes from take-off to landing.

YOUR FLIGHT CHARTS

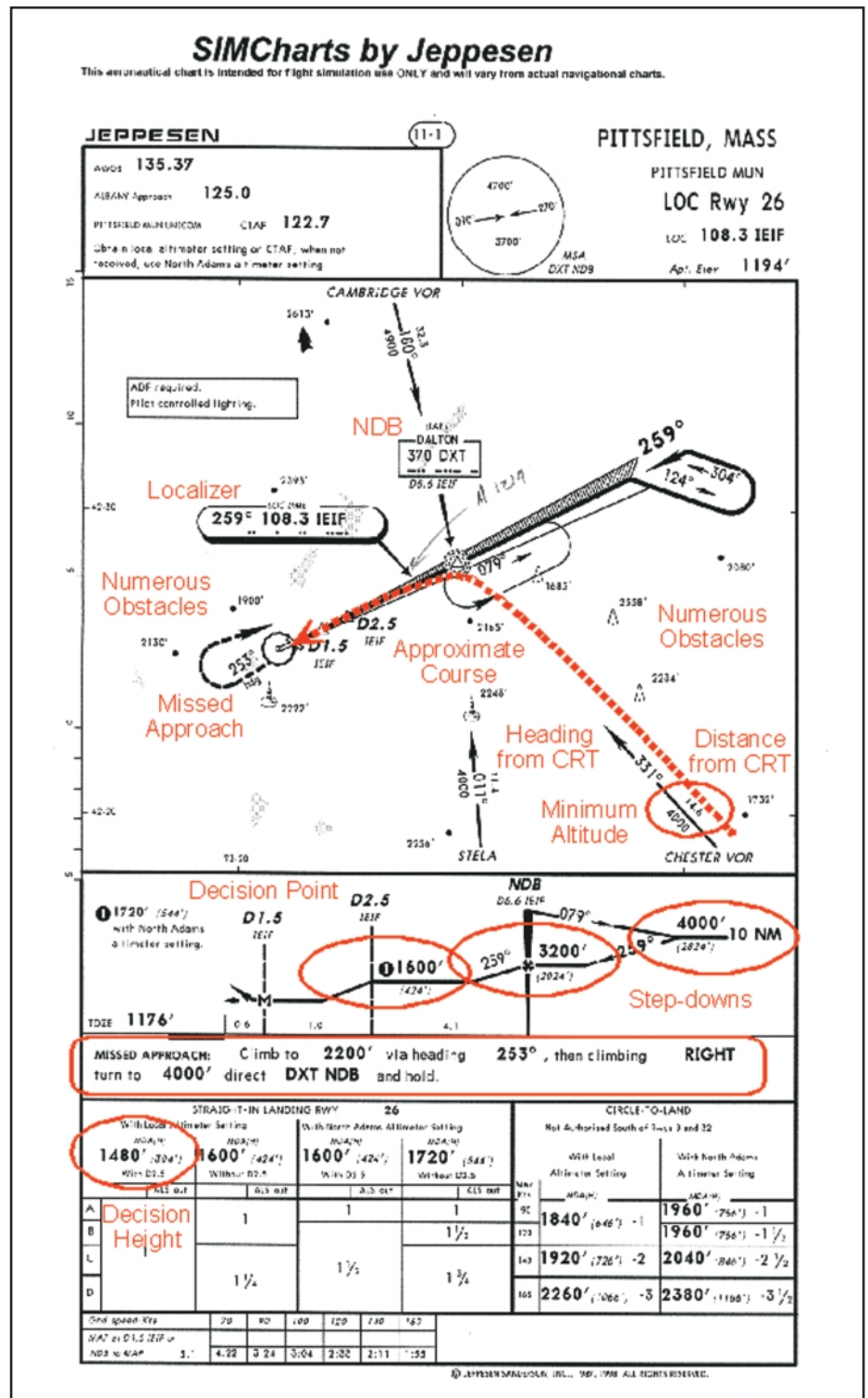
The charts for today's flight show the instrument procedures for all its portions: 1) departing Hartford, 2) flying through the heavily travelled airspace of south western New England, and 3) approaching Pittsfield Airport (KPSF). Familiarise yourself with all relevant aspects of these charts before taking off so you won't have to fumble around en route trying to figure them out. Because some of the instrument procedure charts are not to scale, the courses depicted on them are not precisely drawn. On these charts, follow the textual directions and use the graphical depictions for comprehension only.

Because ATC guidance is unavailable to us, we will simulate the guidance we might get and rely on our instruments for supplemental guidance.

Departure

Hartford Airport (KHFD) does not provide any standard instrument departure procedures. Therefore, we will turn left about 20 degrees after our climbout and head right to Bradley VOR (BDL). Our en route portion will begin as soon as we depart Hartford's airspace. The track distance between our take-off and course interception is shorter than five nautical miles.

Pilots must communicate with an airport's ATC when flying through its airspace, as we will do with Bradley International on our way to Pittsfield. The chart shows Bradley's airspace extending almost to Hartford. Actually, Bradley's Class C airspace extends well beyond the airport and includes other airports too. So we'll need to contact Bradley ATC soon after taking off.



Pittsfield Approach

En route

The en route chart shows an airway heading northwest from BDL and passing just south of Pittsfield. Or, we can fly to Chester VOR north of BDL. Not using a the airways is all right as long as such a

route is clearly shown on the flight plan filed with ATC.

We can use a relatively low altitude so we won't climb for half this short flight and descend for the other half, but we must be sure to remain above the mountains.

The IFR chart doesn't show terrain, but the airways in the area show minimum altitudes of 3,500 feet (1,068 metres) MSL, so we'll be safe as long as we stay at or above those altitudes. A cruising altitude of 6,000 feet (1,830 metres) MSL should be fine for this flight.

Arrival

Being a small municipal airport, Pittsfield has no prescribed arrival procedures. So we'll simply head toward the airport and position ourselves for landing when we get there.

Approach

Pittsfield does have an instrument approach procedure for Runway 26. Luckily for us, the wind at Pittsfield is 240, so this approach will be ideal. Actually, the wind is so slight at Pittsfield today that we could use any runway we wanted. The important points are that mountains are very near this airport, visibility is low in summer haze, and the elevation is more than 1,100 feet (336 metres) above sea level. So we'll use the approach that keeps us clear of high terrain and obstacles.

The instrument approach for 26 calls for a procedure turn, but we don't need it from our arrival direction. We can simply fly to Dalton NDB (DXT) and join the localizer from there. The profile view shows interception of DXT at 3,200 feet, then a step-down to 1,600 feet. The decision height is 1,480 feet, and the decision point (D1.5) is 1.5 miles from the localizer transmitter. With the 2,500-foot ceiling and three-mile visibility, the runway should be clearly ahead of us by the time we arrive at D1.5. If it isn't, we've failed this approach miserably.

PLAN YOUR FLIGHT

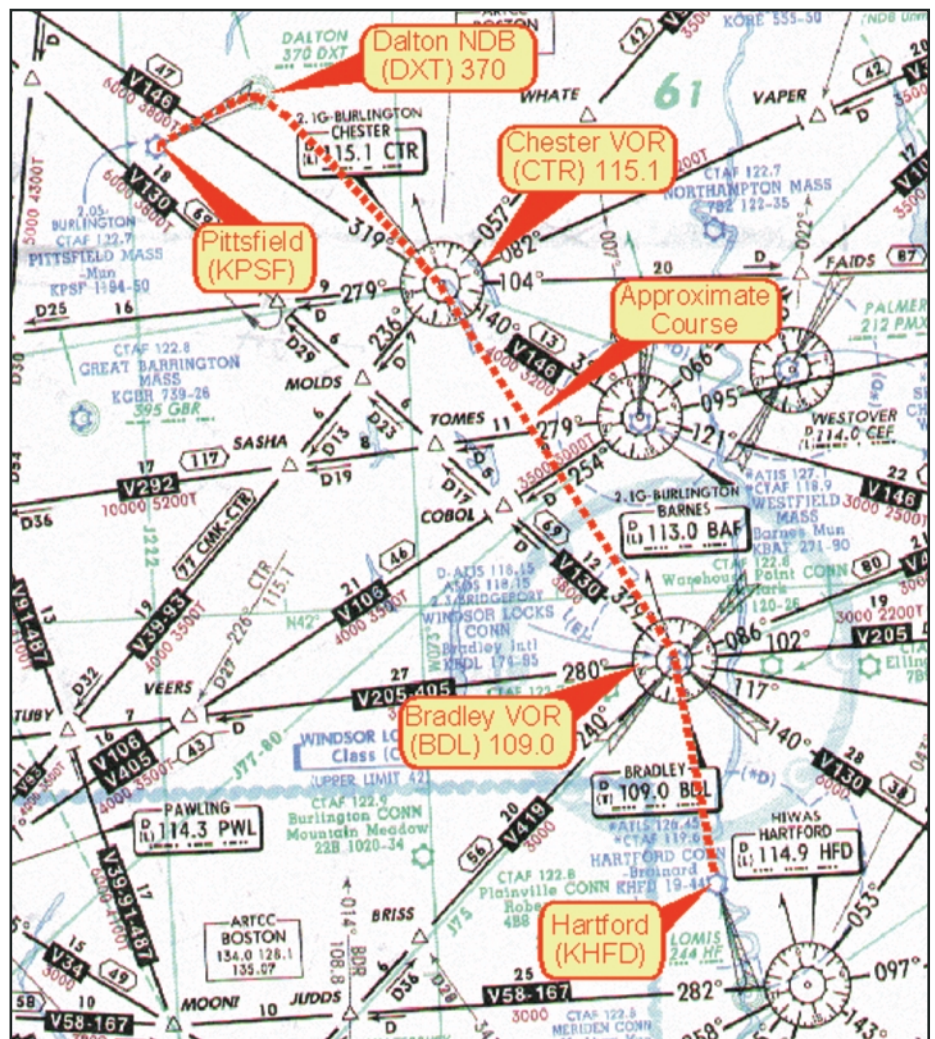
Based on these charts, lay out the course you will fly from Hartford to Pittsfield. Include the relevant airways, nav aids, intersections and fixes shown on the charts. We'll use Bradley as an alternate because if weather at Pittsfield is bad enough to prevent landing, we'll need Bradley's full ILS approach assistance.

Electronic Flight Planner

If you use the Flight Simulator 2000 electronic flight-plan feature, you can include all needed nav aids, intersections and fixes. When this feature is used, the GPS window will show your course to these fixes and the destination airport. If you choose to not use it, you will need to head towards them until the fixes appear on the GPS map, then head directly to them. Or, you can revert to conventional radio navigation and forego the GPS guidance altogether. You might try the flight once with electronic flight planning and once without for the different experiences.



Approaching Pittsfield runway 26 in summer haze



Our route from Hartford to Pittsfield

To use the electronic flight planner, enter the following data:

Departure: Hartford (KHFD) Runway 02

Arrival: Pittsfield (KPSF) Runway 26

Alternate: Bradley (KDBL) Runway 24

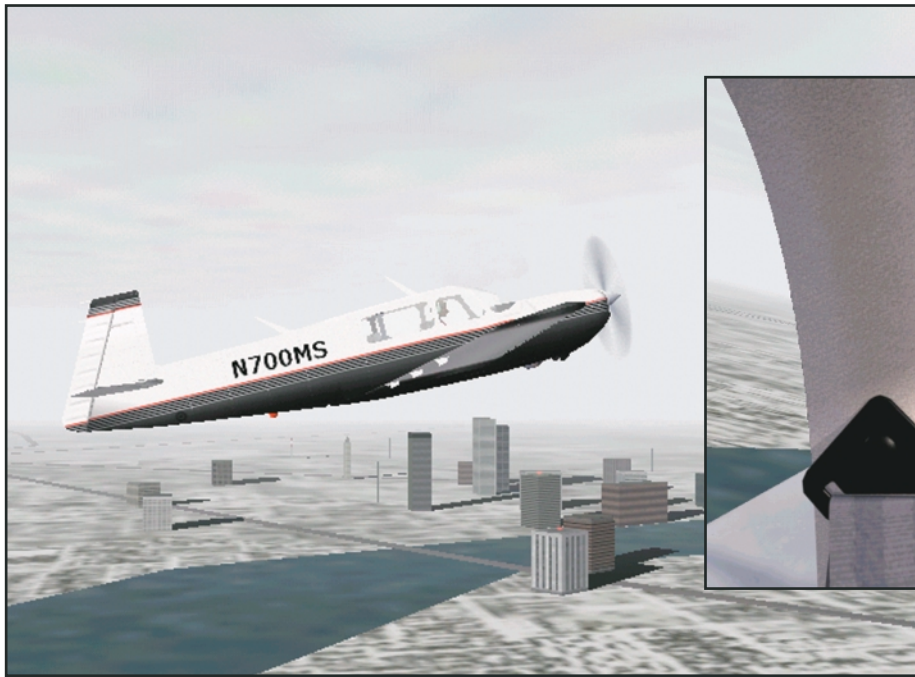
Waypoint: Bradley VOR (BDL)

Waypoint: Chester VOR (CTR)

Waypoint: Dalton NDB (DXT)

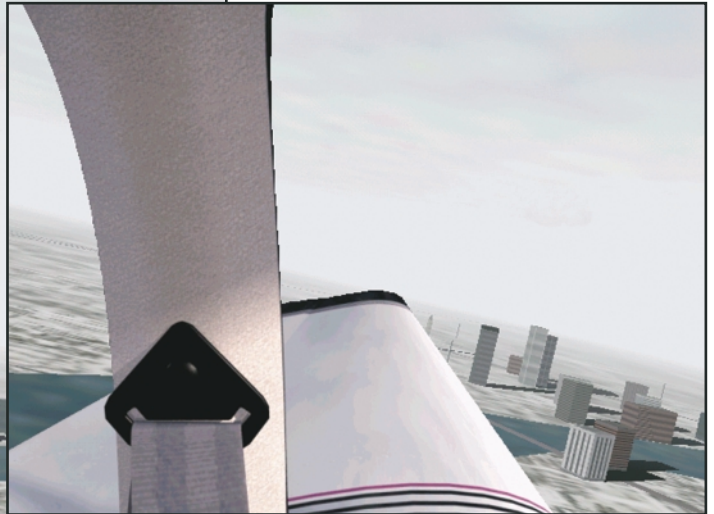
Altitude: 6,000 feet (1,830 metres) MSL

The electronic flight planner is handy, but old-fashioned paper charts and flight plans are still useful for seeing our course and estimated times at a glance.



Passing downtown Hartford during climbout

Downtown Hartford skyline during climbout



PREPARE YOUR AIRCRAFT

To make your aircraft ready for this flight, use our abbreviated checklist in our 'Flight Setup' section.

TAKE OFF

Take off normally, including cockpit preparation and appropriate ATC clearances, as explained in our previous tutorials. Additionally, check your engine instruments. The Bravo's manifold pressure should be at or above 38, and the oil pressure should be at least 24. The Bravo should lift off at about 60 to 65 knots. If you use other aircraft for this flight, its performance characteristics will differ from these.

During take-off and climbout, you will have a slight tail wind. After changing heading at BDL, we'll have a slight cross wind from our left.

Climb out at about 85 knots. During your climbout, adjust your cowl flap as necessary to keep your engine temperature in the green range – not too hot or too cool. Retract your flaps at about 90 knots. After your initial climbout, your Bravo should be able to climb easily at 700 feet per minute and 120 knots.

Observe Hartford's downtown buildings and the Connecticut River to the left as you climb out from the airport and toward BDL.

DEPART HARTFORD

Without a departure procedure, we have no prescribed climb rates. Conveniently, we can head straight out towards our first waypoint without turning. So after reaching 1,000 feet (305 metres) above local terrain, turn left 15 degrees toward BDL.

Contact KBDL approach at 127.8, or simulate this contact, when you enter its Class C airspace, which will be two or three minutes after you take off.

FLY EN ROUTE

Soon after leaving Hartford and gaining sufficient altitude, you should receive the signal from BDL. This VOR should be straight ahead or very close to it, so adjust your heading as needed to head straight for this navaid.

Your mild left crosswind won't push you off course too much, but be sure to pay attention to your position anyway.

While GPS makes navigating and plotting very easy, it also eliminates the challenges that make these flights interesting. So to avoid the likely boredom, try relying on common radio-navigation methods for maintaining your course and plotting your positions en route. You can use the DME feature of BDL and CTR to help track your position en route, or you can use the age-old time/distance/speed method.

If you are using the GPS course plotter, which shows on the map screen the courses from origin airport to the fixes to the destination airport, simply follow those course lines for each segment. If you are using GPS but not the course plotter, maintain your 006-degree heading toward BDL until you see it on the GPS screen, then head straight for it.

Remember from previous flights that your engine will behave differently at various altitudes. The higher it gets, the less oxygen it will have for combustion, so you will need to adjust the fuel mixture to compensate. The engine will not perform well at all otherwise. The engine is performing best when the TIT (turbine inlet temperature) gauge reads 1750, so

adjust the mixture until the TIT returns this reading. Do not exceed 1,750, however. Again, these performance readings do not apply to other aircraft.

Icing will not happen in these hot summer temperatures and low altitudes. Look at your outside air temperature gauge to see how little the air temperature has changed. Check your engine temperature, and open your cowl flaps a bit wider to help cool the engine.

Conserve fuel by changing the propeller pitch at higher altitudes. We found that the Bravo cruises easily at 170 knots and uses 15.16 gallons of fuel per hour with the following engine settings: RPM 2,000, manifold pressure 30 and TIT (1,300). If your engine is using fuel too fast, you could run out of fuel short of your destination.

Paying attention to your progress and status is important on a short flight like this. You could easily pass important waypoints before you knew it, if you were distracted, sightseeing too much, or fumbling with charts.

You should be close to your 6,000-foot (1,830 metres) MSL cruising altitude when you fly over Bradley. After passing BDL, which is at KBDL, turn left 20 degrees to a heading of 345 and head for CTR. Reset your Nav-1 radio to CTR's frequency (115.1), and reset Nav-2 for BDL (109.0). Chester is 24 miles from BDL, so you should arrive there in eight to ten minutes. If your ADF isn't set on DXT (370), tune it in now.

Cruise En Route

Once you have attained our 6,000-foot (1,830 metres) MSL cruising altitude, you may engage your autopilot or maintain altitude and heading manually. Using autopilot relieves repetitive tasks, but being relieved of things to do makes the flight boring. Be sure your cowl flaps are closed whenever cruising. They are not needed, and they increase drag.

This region of New England is at the northwestern fringes of the Hartford/Springfield metropolitan area. You'll fly over urban areas for about half the flight, then over rural mountainous terrain for the other half. These mountains are not very high, but they're high enough for skiing in winter and hiking/camping in summer. Any pilot can get lost flying in this combination of forest and thick summer haze. An aircraft that goes down in these mountains can take a while to find, so this terrain should be taken seriously.

As you pass CTR, turn left 14 degrees and head 331 toward DXT. Change your Nav-2 to CTR and use its DME to track your position. On this leg, you should have CTR directly behind you and DXT directly ahead of you. Adjust your heading as necessary to position both these needles accordingly.

Cruising in the yellow zone of your airspeed indicator is all right if there is no turbulence. Abrupt manoeuvres are prohibited at these speeds, but straight and level flight is no problem in calm air. If you experience or expect any turbulence, keep your airspeed in the green zone. By the time you will make sharp turns for the airport approaches, your airspeed will be well within the green zone.

Would you like to fly visually for a while? You can as long as you stay out of or above the clouds. Today's scattered clouds shouldn't be much problem. The more serious hazard is the summer haze, but the 3-mile visibility doesn't mandate instrument flight. Once you're safely above the clouds, you may fly VFR on top, like we did over England in the previous tutorial.

Descend Towards Your Destination

Because DXT is less than 15 miles from CTR, you'll need to begin descending soon. Remember our simple formula for determining when to begin descending: Cruise altitude (C) less target altitude (T) multiplied by 0.003 equals distance from target in miles (D), or $(C-T) \times 0.003 = D$. In this case, $6,000 - 3,200 = 2,800 \times 0.003 = 8.4$ miles. So when you're 8.4 miles from DXT, begin descending to 3,200 MSL.

But how can we know when we're 8.4 miles from an NDB? We track our position from the VOR behind us and subtract that from the distance between the VOR and the NDB. In this case, the distance between the CTR and DXT is 14.6 miles, so when we're 6.2 miles past CTR, we'll be 8.4 miles to DXT. We can also use time/heading/speed to estimate our position past CTR if we like. It will be about four minutes. We can always fall back on the GPS reading, which is precise to within 100 feet (31 metres).

Anybody who might think our discussion of descent points is too much trouble should think again, because real-world pilots make these decisions and calculations frequently.

Do not descend below 3,200 feet MSL. The mountain peaks in this area are about 2,200 feet, and regulations require at least 1,000 feet of clearance in mountainous areas. Besides, the instrument approach calls for passing DXT at 3,200.

APPROACH PITTSFIELD

As you get closer to DXT, perform these important tasks: (1) Readjust your altimeter for local pressure, which you will take from your weather report or the airport's ATIS. (2) Turn on your landing lights. (3) Switch to the tank containing the most fuel. (4) Adjust the propeller and fuel mixture as needed. (5) Recheck your fuel quantity. (6) Disengage your autopilot. (7) Adjust your airspeed as necessary to maintain a descent airspeed of 150 knots. If you are dangerously low on fuel, request emergency landing procedures from ATC. Otherwise, follow the published approach procedure.

When you're 12 miles from CTR, you should see Pittsfield's south-eastern edge out of your left/front window. Notice that you can't see very far in this hazy atmosphere.

Because of the way Flight Simulator 2000 manages weather, conditions at the airport will vary when you arrive in its airspace. The scattered clouds will move from southwest to northeast (240 to 060) at 3 knots in accordance with the weather conditions we selected before embarking on this flight. As a result of this cloud movement, exact conditions will differ at various times and for various pilots. Your view upon arriving in the airport's airspace might be obscured by clouds passing through, and it might be clear. With the instrument procedure being right in the middle of the cloud layer, you might be able to see where you're going and you might not. Having no ATC assistance, you just won't know until you get there. But today's three-mile haze will remain constant, so you won't see anything more than three miles from you anywhere along this flight, which means you won't see your runway until you are within three miles of it.

TIP: Make a flight/situation here so you can practice entering and following the instrument course.

The Instrument Approach Procedure

The instrument approach for Pittsfield's runway 26 is simple. Just before reaching DXT, turn left and head 259 along the localizer beam. Before you get to DXT, be sure your Nav-1 is tuned to the localizer at 108.3, and set the OBI-1 CDI to 259. Be sure your airspeed is between 110 and 120 knots so you can make the turns easily.

We advise turning left just before reaching DXT so you don't fly past the runway centreline. The approach chart says DXT is 14.6 miles from CTR, so when you're 14.1 miles from CTR, you'll be one-half mile

from DXT. Begin your left turn towards the localizer at this point.

Notice that the approach chart shows numerous elevations and obstacles in the approach area. Visually discerning peaks from valleys is very difficult in this three-mile haze. For this reason, be sure to follow the prescribed course and altitude minimums strictly. While you're turning left toward the localizer, you can begin descending to the next level on the chart, which is 1,600 MSL.

Once you're on the localizer, you must stay on course and step down exactly as shown on the profile view. When you're at D2.5, descend from 1,600 MSL to 1,480 MSL. Do not descend below this altitude until you see the runway ahead of you.

NOTAM: Flight Simulator 2000 shows three 200-foot (60-metre) chimneys below the approach area about 4.5 miles from the runway. They are too short to require depiction on the chart, and you should be about 400 feet above them at this point along the approach. But if you're not executing the step-downs properly, you could scrape your gear or right wing tip!

When you reach D1.5, runway 26 should be visible straight ahead through the haze. If it's slightly to either side of straight ahead, adjust as necessary to align the centreline and land. If the runway is too far to either side of straight ahead, or not visible at all, abort the landing and execute a missed approach.

Missed Approach?

The chart calls for climbing to 2,200 MSL on a 253 heading (remember that the approach heading was 259), then a climbing right turn to 4,000 MSL, then direct to DXT and execute the holding pattern shown on the chart. Because of the high terrain and obstacles in the area, be sure to perform this missed approach precisely. Inform ATC of your missed approach at your earliest convenience. After executing the hold, repeat the approach.

CONGRATULATIONS

You have successfully approached and landed at an airport of a higher elevation than the airport you departed in a mountainous area in low visibility. Well done, indeed!

Keep flying this tutorial to build your proficiency. Apply stronger winds and turbulence and advance to more sophisticated aircraft to make it more challenging if you like. For more information about navigation and instrument flying, read Bill Stack's Flight-Sim Navigation and Instrument Flying for Flight-Sim Pilots that can be obtained from www.topskills.com/flitsim.htm.

See you next time. ■

Bill Stack

FLIGHT STIM

If you're only used to using your eyes and ears when you fly, it's time to dust off your sense of touch as manufacturers start showering us with gadgets to simulate shake, rattle and roll. Here's a couple of the more affordable options that'll help you feel the noise.

RumbleFX Headphones

The search for new and creative ways to enhance our virtual flights will always exist, driving simulation experiences to even greater heights. Some developments will no doubt be giant leaps, while others will make somewhat less of a contribution to our flight decks. The RumbleFX Force Feedback headphones from Evergreen Technologies fall somewhere in the middle. An affordable, effective, and simple product from Oregon USA, these stereo headphones certainly deserve a closer look.

Force Feedback?

Force Feedback is nothing more than vibrations that are transferred through some device (a joystick for example) onto our hands, spine, seat, or in this case our ear/head area. The RumbleFX headphones use a DSP (Digital Signal Processor) to capture low frequency signals that average headphones don't reproduce. With the aid of transducers — devices that convert detectable physical phenomena (sound, light, and pressure) into electronic signals that can be processed by a computer — these signals are converted into vibrations, which allow you to 'feel' the sound. A miniature subwoofer is contained within the headphones, for quality listening to music and soundtracks as well.

Plug In, Select, and Listen

The headphones won't keep you up late messing about with drivers and IRQs. Simply plug them into the output port of your PC's sound board, install the supplied AAA batteries, and you're ready to go. The palm-sized control unit

provides volume and Force Feedback adjustments, an LED lets you know that Force Feedback is engaged, and there's a basic belt/shirt pocket clip for securing the unit to stop it tangling with your yoke or joystick. Sound will be present regardless of battery installation, but the Force Feedback effect requires its own power source. By selecting between OFF, Level I, and Level II, you can then choose the intensity of the experience. In the OFF position, there's no Force Feedback function, and the headphones won't draw power from the batteries. Level I is considered to provide moderate Force Feedback effect, while Level II provides the maximum, according to Evergreen.

The excellent quality of the headphones and their comfortable fit justify the price on their own. The headband and ear cups are nicely padded, and are wrapped in soft, synthetic material. The earpieces are marked Left and Right (please, no old jokes about a well known chain of clothing stores and a pair of knickers), while the silver/black contrast adds a touch of professionalism to the finish.

Do They Really Rumble?

'A totally addictive sensation' is the manner in which Evergreen hypes the headphones' abilities, although we prefer to be slightly less dramatic and a little more realistic. The basic sound quality is indeed very good and could justify the purchase on its own. Music CDs sound terrific, with a little help perhaps from the Sound Blaster Live Value! card on the test machine.

The RumbleFX headphones shake and vibrate not actually in the ear, but rather against the area around the ear. The ear cushions rest against the skull, so this is

quite effective at giving a sensation of 'feeling' the sound as opposed to simply hearing it, and is what the headphones are really all about. The effect transfers slightly to the neck and spine area, which is the region several other Force Feedback devices have concentrated on.

Using Flight Simulator 2000, the intensity of the vibrations is governed not only by the bass level setting, but also by the choice of aircraft. Different planes yielded different levels of vibration; the gear extension of a Phoenix 747-400 left us in no doubt that something was happening below, while the default King Air was noticeably quieter, and the external sounds from Jan Visser & Co's DC-3 were nothing short of amazing. Tests using Combat Flight Simulator 2, Falcon 4.0 and Jane's F-18 showed a definite virtual lift in the combat zone — bullets whizzing by your ears, the pounding sound of rockets departing, and enemy aircraft explosions all contributing to a deeper sense of immersion thanks to the improvement in the way they sound and feel.

The Control Unit

There is, however, one thing that could be improved on. The design and quality of the control unit is slightly questionable, particularly as it's coupled to such fine headphones. We found the length of the cord from the headphones to the controller to be far too short, which kept us fussing over where and how to secure it. The clip provided was slightly annoying as well; the size of it and the tension in the spring were enough to make us leave the unit just resting on our lap. The control unit itself seems too small and

VIBRATION!



	
Manufacturer:	Evergreen Technologies
Price:	£40.00 (approx.) plus postage
Website:	www.evergreennow.com
Release Date:	Out now
At a glance: Quality and 'feel' of sound are superb, although the control unit is a minor annoyance. Not essential, but an affordable and worthwhile buy for anyone seeking more impressive audio.	

What You Get

- One set of RumbleFX headphones
- RumbleFX feedback controller with volume and vibration controls
- 2 AAA batteries
- Headphone conversion jack
- 90-day warranty

Features

- Vibration bass control
- Built-in active bass amplifier
- Separate bass level control
- Soft cushion earcups
- Adjustable padded headband

Compatible With

- PC
- MAC
- Palm games
- Nintendo 64, Super Nintendo, Gameboy 64
- Sega Dreamcast
- Sony Playstation

isn't made of the best plastic. Placing the unit half way between the headphones and the sound card jack, making it a little larger, and upgrading its quality would drastically improve upon this otherwise excellent product. Another point worth mentioning is that the level I bass setting had no noticeable effect.

Although these are certainly a great set of headphones that provide a unique effect, we'd hesitate to say they'll change forever the way you fly. For what they provide, though, it's doubtful if any of you will regret purchasing a set.

The Aura Interactor

An interesting and slightly odd device was sent to PC Pilot for testing recently — the Aura Interactor. Described as 'virtual reality game wear', it resembles a small backpack, complete with padded shoulder straps, a two-inch nylon waist belt, and a rather dismal attempt at being ergonomic with a moulded plastic structure. Apparently the Interactor was released a few years ago and never made it to the big time, which is obviously not great news for its designer, manufacturer, or distributor, but there may yet be a

reason to own one. What once retailed for £109.00 can be purchased today for around a paltry £14.00 plus postage. Now that may raise an eyebrow or two and beg the question of whether this a pile of junk, explaining why thousands of them are lying in a warehouse in the Midwest of the US.

A Closer Look

Resembling the RumbleFX headphones in concept, the Interactor was designed to deliver sound vibrations to the lower back area, and just may be the ideal companion to the headphones. Originally developed



REVIEW SCORE:	
Manufacturer:	Aura Systems Inc.
Price:	£14.00 (approx.) plus postage
Website (for purchase):	www.oshealtd.com
Release Date:	Out now
At a glance: An affordable enhancement for the flight simulation experience. Easy to set up, user-configurable, and an ideal compliment to RumbleFX headphones. Uncomfortable to wear as instructions recommend.	

A bargain at twice the price, but you'll have some explaining to do if anyone sees you wearing it.

for use on Sega Genesis and Super Nintendo, the Interactor can also be used with any audio source, including a PC, VCR, DVD, and CD player. The retail box contains the backpack, control unit, cables, AC adapter, game adapter, mini stereo adapter, and 29-page pocket-sized manual. There's no software required and, like the RumbleFX headphones, it simply plugs into your sound card's audio-out port. A splitter may be required in order to use your current speakers or headphones, which should be available at most electronics shops. Connecting the power supply, controller, and pack is simple; turn the power switch to ON and you're ready for another trip down virtual reality road...or are you?

The Pack: Not a Work of Art

One attempt at wearing the pack will convince you that it wasn't designed for long-term comfort, and this is possibly the reason for its failure to sell. Measuring 12" x 10", it's more like a poorly designed child's backpack than something a flight simulator enthusiast would like to see in the cockpit. Suffice to say that anyone with a 40" chest or larger would have difficulty strapping this on. Not to worry though, the solutions are simple and worth the effort.

We discovered two ways of overcoming the design faults, and there are no doubt more. Option one is to place the unit on your chair, with the speaker against the chair's back. Buy a comfortable back support cushion and place it against the Interactor. The cushion provides comfort for the user and actually improves the overall experience by muffling sounds

without minimizing vibration. Option two involves simply strapping the pack to the outside (rear or underneath) of the chair. This may be the more desirable, as it doesn't affect the comfort level of the chair, and also hides the device. Either way you can avoid the hassle involved in actually wearing it.

Onto the Flight Deck

The vibrations created by the Aura Interactor certainly added a missing ingredient to flights in Combat Flight Simulator 2, Falcon 4.0 and Flight Simulator 2000. In fact, after having flown with it for several hours, its absence was quite noticeable.

The control unit has several adjustments worth mentioning. The power switch supplies (apart from the obvious) the amount of force transferred to the pack, graduated from 0-10. The filter dial adjusts the level of sound that actually triggers the unit; the recommended setting is 10, which will allow the slightest of sounds to initiate the vibes. There is also a game/music selection switch to further fine-tune the pack to your liking. Experimenting with these settings often brought about improvements in the sound/feel department. Some aircraft even benefitted from a switch to the music mode. The bottom line is that there are plenty of adjustments to suit most people's preferences.

In real life aircraft all have a different sound and feel, and the Interactor is quite capable of simulating these differences. We tested the Cessna 182, Lear 45, DreamFleet 737-400, and Phoenix 747-400 in Flight Simulator 2000 and came

away smiling. This uncomfortable-to-wear thing will transmit realistic ground rumbles, gear retraction clunks, and low frequency flap extension vibrations into the seat of your pants. Naturally enough, air combat experiences were enhanced as well, but not to the same degree as during regular flights in Flight Simulator 2000. Whether it was Falcon 4.0 or Combat Flight Simulator 2, missiles, guns, and bombs had less impact on the flight environment than we had anticipated.

The Final Analysis

The combination of the Aura Interactor, RumbleFX headphones, and a bad weather night time ILS approach is a fantastic virtual experience and, considering the small investment, comes highly recommended. The raging discomfort of the backpack can be easily remedied, and shouldn't be a deterrent to purchasing one. We can't think of any other flight simulator enhancement that can be had for so little money. Go and get yours at www.oshealtd.com (after you've marvelled at the wonderful range of other bizarre items on offer) and, yes, overseas shipping is available. ■

Greg Gott

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EPOX 8KTA3+
512MB SDRAM
Sound Blaster Live! Value
GeForce2 MX 200

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VideoLogic Vivid!XS

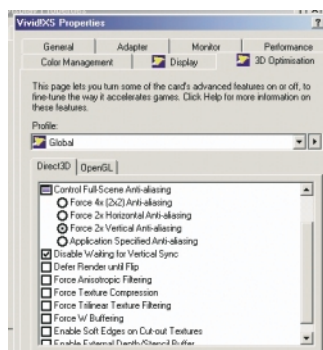
Imagination Technologies invents the Sharper Nail

TEST SYSTEM

Abit KT-7 with AMD Athlon 945MHz
384Mb SDRAM 145MHz
Creative SB Live
Windows ME

Boards compared:

GeForce2 Ultra (driver 12.41)
GeForce2 MX (driver 12.41)
VideoLogic Vivid!XS (driver 107.114)



Properties setup is both clear and detailed



Vivid!XS outlines in WarBirds III test – shadows are beautifully smooth!



Running GeForce2 MX in WarBirds III – some rough edges visible

When designing new video hardware, the question to be resolved is: "Do we use a larger hammer, or a sharper nail?" Imagination Technologies have chosen the latter approach with their KYRO II chip.

KYRO II is the chip used by VideoLogic for their new Vivid!XS 3D accelerator, and it uses tile-based rendering to determine what parts of a scene must be rendered. In short, the hardware tests whether or not a polygon is rendered before it is actually drawn, so that only visible pixels are rendered. This method saves the hardware from having to draw and output polygons to the screen that will end up being hidden by other objects anyway. The increase in rendering efficiency is as high as 300%.

KYRO II needs that increased efficiency, since the core clock only runs at 175MHz. Furthermore, the KYRO II's memory controller is not DDR SDRAM capable, so the boards are produced with the slower SDRAM capability.

Incredibly, tests are revealing a level of performance equivalent in some instances to that of GeForce2 Pro boards. The weakness of the current KYRO II generation is that it is DirectX 8 compatible, but not compliant, meaning that the Vivid!XS board does not support all the features of the newer video hardware. As a competitor to GeForce2, however, the new chip looks to be an excellent choice.

In fact, since all internal rendering is done at a full 32 bits, it is claimed that image quality is superior on the Vivid!XS, and

that there is less of a performance penalty for anti-aliasing than there is with the nVidia boards.

Installing Vivid!XS

The installation process is flawless if you first close background applications that monitor memory, such as firewall and anti-virus software. VideoLogic recommends running their own Setup programme, rather than using the Plug 'n' Play hardware wizard. After closing our background applications, installation went smoothly, although we did have to adjust the display positioning and resize the screen slightly. The new installation apparently uses a different refresh rate for our 19" monitor.

VideoLogic's website was then checked for the latest drivers. We found a 7Mb

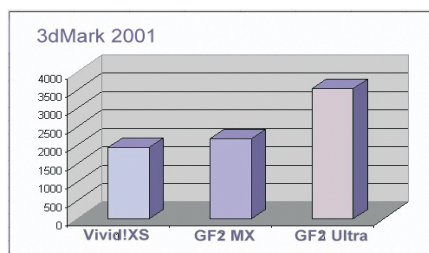
DirectX8 Compatibility and Compliance

DirectX is the software layer between your video hardware and your simulator that tells the simulator what features are supported by your hardware. Microsoft releases a new version of DirectX every six months or so.

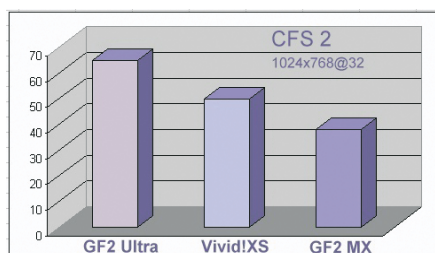
The Vivid!XS is DirectX 8 compliant, but not DirectX 8 compatible. Compliance means that you can run DirectX 8 simulators with your Vivid!XS board, in spite of the fact that the KYRO II chip does not support the complete set of DirectX 8 features.

The latest video hardware, such as the GeForce3 boards and ATI's new Radeon II, are DirectX 8 compatible. This means that they support fully all the features of DirectX 8. This translates into superior images in some cases, and superior speed most of the time.

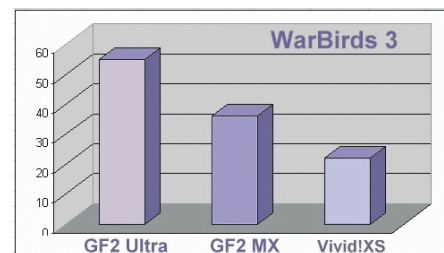
To put it simply, if a software developer supports the advanced features of DirectX 8, video hardware which is compliant rather than compatible may not be able to run that simulator with all its graphics features enabled, or may run it at lower frame rates. You can choose the most advanced DirectX 8 compatible hardware, but you do pay a cost premium for the latest hardware.



3DMark scores for the three boards - but does this tell the whole story?



Frame rate tests in CFS 2 show the true capabilities of the board



Comparative frame rate performance in WarBirds III

download with a new driver for Windows ME, and ran the update without encountering any problems.

Comparisons and Testing

Tests were run on three boards - GeForce2 Ultra, the budget GeForce MX, and Vivid!XS. We performed the tests using 3DMark 2001, the standard for synthetic testing, and for simulators we chose Combat Flight Simulator 2, and WarBirds III. It certainly isn't fair to compare the Vivid!XS board - costing around £85.00 - with an expensive performer like the GeForce2 Ultra (around £250.00). That's why we included the GeForce2 MX which is priced in the same range as Vivid!XS.

The only two issues when comparing video hardware are performance and compatibility (OK, three if you count price!) We all want the most horsepower for our hard-earned cash. 3DMark 2001 runs a suite of sixteen tests to determine performance during actual operation, and then averages the results of these tests to present a 3DMark score. Take a look at the results in the chart.

What's particularly useful about 3DMark is that it performs an identical batch of tests using an identical system. A possible downside is that the default test is slightly biased in favour of hardware that supports hardware-based T&L (Transformation and Lighting), which Vivid!XS does not. nVidia boards perform T&L in hardware, largely removing the burden of these intensive tasks from the CPU. On the other hand, since every new game supports hardware T&L, it is realistic to compare two video boards in the same price range.

Incredibly, the overall 3DMark scores from the two boards are very close. Considering them more closely, it appears

that whenever the complexity of a scene and its lighting increase dramatically, Vivid!XS falls behind the GeForce MX. 3DMark doesn't tell the whole story, however, as it's biased towards raw throughput, and the KYRO II doesn't work that way. When we ran tests using both our simulators, some interesting results came to light.

We set up Combat Flight Simulator 2 Pacific Theatre for Free Flight mode, choosing the A6M2 Zero. Resolution was set at 1024x768, with a colour depth of 32 bits - this mode really does look beautiful! The graphics options were set at the maximum - with almost a 1GHz Athlon and plenty of memory, there is no reason not to. These settings were identical for testing all three video boards, and the results can be seen in the chart.

Fascinating. Results during flight simulation, produced with anti-aliasing ON (our default mode for flying in Combat Flight Simulator 2) show the Vivid!XS performance to be equivalent to that of the GeForce2 Pro. This aroused our interest in a comparison using WarBirds III. This version of WarBirds is written for DirectX 8, whereas Combat Flight Simulator 2 was written for DirectX 7. How would Vivid!XS perform when run under the latest Microsoft graphics API?

As might be expected, Vivid!XS has a little more trouble when facing direct support for T&L under DirectX 8. Resolution, colour depth, and anti-aliasing settings were left unchanged for the WarBirds test, in Free Flight offline mode using the Me109 F-4, and frame rate was taken in outside view.

The final evaluation is quality of image. Honestly speaking, it's difficult to discern any qualitative difference between

Vivid!XS and GeForce hardware until a careful look is taken at the line edges while running anti-aliasing. Which image do you prefer?

Sample 1 is a screen capture taken running Vivid!XS in Combat Flight Simulator 2, and Sample 2 is the same image with the GeForce2 MX board. Notice the smoother edges on the underside of the fuselage in Sample 1 and, what's even more impressive, note the smooth lines around the edge of the shadow! Numerous reviewers have remarked on the excellent anti-aliasing ability of the KYRO II hardware, and others have noted that images are generally richer in texture.

Conclusion

For well below £100.00 you can obtain a copy of the Vivid!XS board without the TV output; if you don't need the latest and greatest hardware, that represents good value. If you're concerned about future compatibility, you can spend about three times that amount on a GeForce3 board, or wait for ATI's new Radeon II to hit the shelves. In the meantime, Imagination Technologies has announced their next generation chip, the KYRO III. You can't help but wonder what they've got in store for us!

Leonard Hjalmarson

REVIEW SCORE:	
Manufacturer:	Videologic
Price:	£65.00/£85.00 with TV-Out (approx.)
Website:	www.videologic.com
Release Date:	Out now
At a glance: Solid performance, easy installation, and TV-Out option for around £20.00 extra. For the enthusiast on a budget this is a reasonable upgrade for outdated video hardware.	

MANUALS FOR AIRLINE PILOTS

Find out how the professionals fly

- Boeing Glass 737 - The Unofficial Boeing 737 Super Guppy 300-400-500 Simulator Checkride Survival Manual
- Boeing 757-767 – The Airline Pilot's Simulator Checkride Procedures Manual
- Ops Guide - New Pilot Stuff – Flying Rules

Those of us with a lust for realistic flight simulation of airliners are frequently frustrated by the lack of information available for our chosen aircraft. The solution to this is usually to fruitlessly search the Internet or even consider buying the actual aircraft manuals. The latter approach would probably involve lengthy discussions with your bank manager and raucous laughter from the airliner manufacturers. Another option is to consider books written to complement the training of airline pilots. The three books we've reviewed here were written for precisely that purpose.

The author, Captain Mike Ray, is a retired airline pilot with over 30 years of flying experience. Given his pedigree, the content should be, and appears to be, pretty accurate throughout. The real question is about their suitability for simulation pilots.

All three are spiral bound and are printed in black and white to a high standard. The information is clearly presented, in most cases using a mixture of annotated diagrams and text. The two books about checkride procedures cover very similar ground and are both about 300 pages long. There are diagrams showing every switch and dial on the cockpit overhead and forward panels, together with those on the throttle quadrant and lower (centre) console. They show you how to

prepare the cockpit for a flight, what should be in your take-off brief, how to start the engines (and what to do if one doesn't start), what happens during the pushback, taxi and pre-take-off checks. Once you are rolling, there is information about what speeds to call, how to rotate safely, and what to do when things go wrong. The sections about flying approaches won't tell you how to control the airliner on the approach procedure, but they will tell you things not normally documented, such as whereabouts along the approach to put your undercarriage down.


The other book, New Pilot Stuff provides a host of background information for a new pilot about to join an airline. It includes useful descriptions of the important features on approach plates, weather considerations and holding speed restrictions. Most of this book is devoted to rules affecting the pilot such as what to do if you are carrying prisoners or are sick. It's fascinating, but the information to help you fly your simulator is limited.

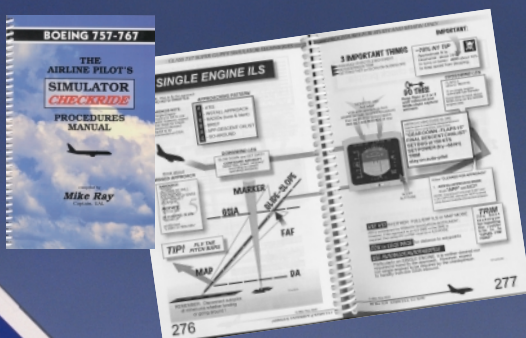
All three books assume a good knowledge of both aviation and the standard abbreviations used, but not knowing these should not detract from the usefulness of the books. They are written to provide commercial pilots with information to hone their flying skills and

boost their aviation knowledge and therefore assume that you know the basics of how to fly these planes.

If you're an aviation enthusiast hungry for information about aircraft and with no budgetary constraints you will doubtless buy all three of these books anyway, and you are unlikely to be disappointed. The checkride books in particular are absolutely fascinating and their suggested retail price, about £35.00 each, represents real value. The New Pilot Stuff is interesting, but less relevant to flight simulation, and costs about £22.00, so all three books would set you back nearly £100.00, plus shipping charges. We'd recommend that if you are tempted, start with one of the two simulator checkride books, both of which we regard as very good value for their in-depth information.

Stephen Heyworth

REVIEW SCORE:	
Publisher:	University of Temecula Press
Price:	Checkride Manuals £35.00 approx. New Pilot Stuff: £22.00 approx.
Release Date:	Out now
Website:	www.utem.com
At a glance: The Checkride Manuals are top-notch for serious simulation pilots, despite their high price, and we score them 5/5. The New Pilot Stuff is slightly less useful for flight simulation (maybe 4/5), but still very interesting.	



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Available now - each one holds up to twelve issues

You've been asking, nay demanding, so we thought we ought to oblige! Yes, the PC Pilot binders are now on sale. Bound in a rather nice blue with the PC Pilot logo on the spine, they will enhance the bookcase of any home and indicate that the owner is an informed reader! Keenly priced at £6.99 in the UK and £9.99 overseas, inclusive of postage.



TAKE OUT a 12 issue subscription and receive a complimentary FREE binder with your first issue.

Downloads

*Star performers
from the Internet*

We delve once again into the seemingly bottomless pit of outstanding add-ons for your favourite flight sims, collected from the major freeware sites around the world. Sorry if we didn't include your work in this collection but the standards are extremely high and there are just so many to choose from. We find that many readers have difficulty accessing downloads from the information we supply. We used to include the complete URL, but we found these were prone to errors or change and so gave you the file names. The best way to locate a download is to type in the aircraft/scenery name, or the author in the file library search facility. This will probably bring up a selection and you can use the filename we've included to get the exact one. Remember, most of these downloads were well featured by the various sites and they do exist, otherwise we wouldn't have been able to get the screen shots!



C-130 Hercules and Panel

Flight Simulator 2000 Aircraft & Panel



Our Star download for this issue is actually two separate files but because they compliment each other so well, we've combined them into a plane/panel recommendation for fans of the Hercules. The panel was designed by Clive Ryan from a series of photographs taken in the RNZAF Hercules NZ 7002 by Steve Moore and includes all the interior views. The aircraft is modelled on a RNZAF C-130H based at Whenuapai Airbase, in Auckland, New Zealand. It has full moving parts, including rear door and ramp, with detailed internal rear cargo hold.

Authors: Aircraft by Adrian and Ian Brausch
Panel by Clive Ryan
Sounds by Adrian Brausch
from Mike Hambly originals

Download From: www.flightsim.com
Filename: Aircraft Filename - hrknzv4.zip.zip
Panel Filename: - hercpnl.zip
Sound Filename: - c130snz1/ 2/ 3/ 4/.zip



A-10 (Warthog)

Flight Simulator 2000 Aircraft

This A-10 aircraft is unusual in that it's not really a complete package but the quality of the textures and fine detailing makes it an outstanding model. We had a scout around but could not find a suitable panel to recommend... Over to you designers!

Authors: Kirk Olsson

Download From: www.avsim.com
Filename: oa-10.zip



NC-121K Constellation

Flight Simulator 2000 Aircraft

This particular aircraft, no.145925, was used in the 1970's by the U.S. Navy's Oceanographic Office to map the Earth's magnetic field under a programme called 'Project Magnet'. It is a repaint of Bill Schulz's Great Eastern Air Lines L-1049. The model is by Stefan Doebereiner and Joe Ng.

Author: Gerry McLaughlin

Download From: www.fsfreeware.com
Filename: juconnie.zip



Manx Airlines Shorts 360-300

Flight Simulator 2000 Aircraft

Known in the trade as the Flying Boxcar the Shorts 360 is popular with many small commercial airlines. This model is painted in a realistic Manx Airlines livery and includes night lighting effects. It comes with checklists, 3D transparent cockpit, moving pilot heads, new gear effects on touchdown, moving flaps, ailerons, and other control surfaces.

Author: Robert Versluys Repaint by Carl Poul Brager

Download From: www.flightsim.com
Filename: manx-360.zip



Lockheed F80-C Shooting Star

Flight Simulator 2000 Aircraft

The Lockheed F80-C, developed in the latter part of WW2, was the first jet aircraft operated by USAF during the Korean war. The FSDS model and its textures are by Massimo Taccoli. It comes with a well-designed panel and has a very stable flight model. Very pleasant for VFR flying when you want a bit more power under the bonnet.

Author: Massimo Taccoli

Download From: www.flightsim.com
Filename: lockf80c.zip



British Airways RJ-100

Flight Simulator 2000 Aircraft

This aircraft is painted in BA's custom scheme: Waves of the City, operated by Cityflyer. The FS2000 model features complete moving parts including flaps, slats, spoilers, engine fans, steerable nose wheel and rolling wheels. It also has a transparent cockpit and night lights/textures. Mike Stone designed it using AD2000.

Author: Mike Stone, textures by John Sibley

Download From: www.flightsim.com
Filename: barjcfwc.zip



Boeing 737-700 (600/800/900) panel 3.0

Flight Simulator 2000 Panel

This panel has all the appearance of a real 737 panel with instruments in their correct positions. An overhead and pedestal panel is included. The author tells us it was made with the help of photographs of the real one, but it is still essentially hand drawn.

Author: Andy Karlstetter

Download From: www.avsim.com
Filename: ndk736.zip



Boeing MD-87/88/90 Panel

Flight Simulator 2000 Panel

Another fine panel from Paul Golding featuring the Boeing MD-87 EFIS, complete with two separate levels of cockpit lighting, switchable HUD, working wipers with sound. The zip also contains two examples of Project Freeware's DC9-51 repainted as an MD-87.

Author: Paul Golding

Download From: www.flightsim.com
Filename: pgmd87v1.zip



Leeds Bradford Airport

Flight Simulator 2000 Scenery

Our screen shot does not do justice to this remarkably detailed scenery of Leeds/Bradford Airport in the North of England. This scenery includes custom macros and static aircraft, which give an accurate representation of this airport that has been relatively forgotten by the flight sim world, apart from our Tutorials.

Author: Paul Baines

Download From: www.avsim.com
Filename: leedsv1.zip



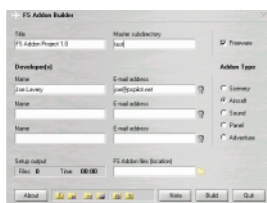
Airport José Tadeo Monagas

Flight Simulator 2000 Scenery

The José Tadeo Monagas airport is close to the city of Maturín in Northern Venezuela. The author Jaime Ortega has depicted both the airport and the buildings surrounding it. Including trees and many custom objects created with Flight Simulator Creator and Easy Object Designer 3.0.

Author: Jaime Ortega

Download From: www.flightsim.com
Filename: mat2000.zip



FS Addon Builder 3.1 (FSAB)

Flight Simulator 98 & 2000 Utility

FSAB is intended to help the FS design fraternity create easy installation packages for all your FS add-ons. Using an easy step-by-step method you can build set-up applications for your scenery, aircrafts, panels, sound, and adventures. The program also allows automatic modification of the scenery.cfg file at the time of installation.

Author: Darren Wilden and Dustin Wilden

Download From: www.flightsim.com
Filename: fsab31.zip



Dornier 128-6 registered D-IBUF

Flight Simulator 98 Aircraft

An accurate turboprop simulation for FS98 that includes the aircraft, panel (with toe brakes!), sounds and full documentation in html-format. The props and all control surfaces are animated and the aircraft has accurate flight characteristics.

Authors: Mathias Elsaesser

Download From: www.flightsim.com
Filename: do1286v1.zip



Helmut Wick's Messerschmitt Bf 109E-7

Combat Flight Simulator

A superb model of probably the most famous German fighter of all time, by the author of WarBirds, Pre-Flight, airShow, etc. With fully moving control surfaces, radiator flaps, opening canopy, symmetrical moving of the landing gear, fully detailed interiors, custom camouflage and markings. The author has also thoughtfully provided a set of textures without the Swastikas, for those they might offend.

Authors: Remy Laven

Download From: <http://www.flightsim.com>
Filename: 109e_hw1.zip



Grumman C-1159 Gulfstream II

X-Plane Aircraft and Panel

The Piper PA-38 Tomahawk is one of the most popular aircraft for flight training here in the UK. This aircraft/panel set depicts an aircraft that the author Chris Buff originally did his first solo in. It comes with a high quality panel that closely replicates the original.

Authors: Chris Buff

Download From: www.flightsim.com
Filename: pa38xpln.zip



Southern California

Fly! II Scenery

A massive download for Fly! II covering the ground texture scenery for the greater Los Angeles area. Based on aerial photographs and includes night textures. You'll need a high-speed link or cable connection for this one, because it's over 105 Mb, but worth the trouble if you like to fly in sunlit skies.

Author: Matt Fox

Download From: www.avsim.com
Filename: Socal.zip

Product Listings

Our comprehensive round up showing our favourites from the many products we've evaluated over the months. Please note that the prices indicated are the RRP where available, but remember the dreaded VAT. Be sure to check for bargains at your favourite sim emporium as there are often savings to be made!

CIVIL SIMS



Elite 6.0

Undoubtedly the best IFR procedural trainer there is. So it should be, the frightening price will put off all but the truly serious - the full kit can cost £695 or more with the new scenery add-on.

Initiative Computing £249.95

www.flyelite.com
Featured: Issue 4



Flight Simulator 2000

Despite much publicised criticism over poor frame rates and misleading PC requirements, this still seems to be the benchmark sim. An awful lot of sim for the money, but invest in a decent PC before buying.

Microsoft £49.99/£69.99

www.microsoft.com
Featured: Issue 2



X-Plane

The 'thinking man's flight sim' is now out in DVD case and is a lot more user-friendly. Well worth a look for flights from Manchester to Mars!

Xicat £29.99

www.xicat.com
Featured: Issue 12



Precision Simulator 744

A no compromise and no-frills approach to flying a Jumbo Jet. No pretty scenery or advanced terrain but probably as close as you'll ever get to the real thing without a trip to a full motion airline simulator.

Aerowinx £189.99

www.aerowinx.com
Featured: Issue 6

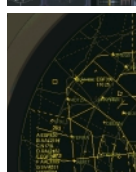


Airline Simulator 2

Some of the best airline flight modelling around with accurate procedures (it's been designed by real airline pilots over many years). Unfortunately not for the faint of heart - old DOS interface and daunting controls a real put-off. A lot cheaper these days, so may be worth a look.

Just Flight £49.99

www.justflight.com
Featured: Issue 1



ATC Simulator

An amazing, if slightly flawed, foray into the world of ATC. Get behind the mike and start stressing out!

PC Aviator £54.95

www.pcaviator.com
Featured: Issue 11



FlitePro

Offers a wide range of training features for the IFR pilot, yet reasonably affordable. Low frame rate for instruments detracts from its overall appeal.

Jeppesen £99.99

www.flitepro.com
Featured: Issue 4

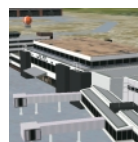
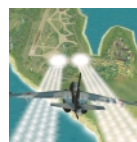


Fly! II

Horribly rushed release resulted in a promising product that needed finishing by the user. If you can put up with huge downloads of patches and manuals, then it's got promise.

Take Two Interactive £24.99

<http://fly.godgames.com>
Featured: Issue 12



COMBAT



Combat Flight Simulator 2



Quite simply the best all round WWII flight simulator there is. However, make sure you've got a decent PC to take full advantage of the looks and feel.

Microsoft £29.99

www.microsoft.com
Featured: Issue 8



Enemy Engaged: Comanche vs. Hokum



Strikes the balance between gameplay and realism perfectly. Ideal for both rocket junkies or rotorcraft rookies alike. Only downside is no single mission mode and it's not as pretty as Gunship.

Empire £29.99

www.enemyengaged.com
Featured: Issue 5



Eurofighter Typhoon



In a class of its own - beautifully combines fast jet flying with realism and action.

Rage £29.99

www.rage.com
Featured: Issue 11



Warbirds III



The latest and best version of this online sim. The one that sets the standard.

iEntertainment Network £7.25 per month
Requirements: Internet link/modem

www.iencentral.com
Featured: Issue 12



Harrier Jump Jet



Fly 17 different versions of the unique Harrier - great VSTOL experience, plus other aircraft missions and scenery that recreates the Falklands War.

Just Flight £24.99

Requirements: FS98/2000 or CFS

www.justflight.com
Featured: Issue 11



Flanker 2.0



Excellent, with great detail. This is one of the few combat packages that is worth calling a simulation. Online fan base will prolong longevity and now there's an update as well.

Mindscape £34.99

www.ssonline.com
Featured: Issue 2



James F/A 18



Technically complex with masses of detail and lots of options. Mission builder is nice. Downside is that it is technically complex and you need a high-spec PC.

Electronic Arts £39.99

www.james.ea.com
Featured: Issue 5



Battle of Britain



Superb flight modelling and the best dynamic campaigns ever are what hardcore dogfighters have been waiting for. Tough on beginners but worth persevering.

Empire £24.99

www.empireinteractive.com
Featured: Issue 9



B17-II The Mighty Eighth



Excellent sound, motion animation, outstanding graphics and T&L support, it looks good and flies even better. The ultimate bomber sim, but demanding on hardware and no FF support.

Hasbro £29.99

www.b17flyingfortress.com
Featured: Issue 9



Fighter Ace II



If you've got a fast Internet link and you fancy some live (for the moment) opposition, then this is as good an introduction as any to combat on the web. Excellent graphics and a reasonable cost.

Microsoft £6.50 per month

Requirements: Internet link/modem

www.zone.com/fightertace
Featured: Issue 7

SCENERY AND AIRCRAFT

**FS Traffic**

Perhaps the best £20 you can spend enhancing Flight Simulator - it really does bring airports to life. Now in boxed and download flavours.

Just Flight £19.99

Requirements: FS98/2000

www.justflight.com

Featured: Issue 2

**747-400 Professional**

Quite simply the best Jumbo add-on for FS2000 we've seen and if you like this you'll also like the 777-200 from the same stable. Read the manual and you'll probably be able to fly the real thing!

Just Flight £34.99

Requirements: FS2000

www.justflight.com

Featured: Issue 9

**767 Pilot in Command**

A new level of excellence for this jet airliner for FS2000. Worth every penny for the abundance of features.

Just Flight £24.99

Requirements: FS2000

www.justflight.com

Featured: Issue 10

**Airport 2000 Volume 2**

Incredibly detailed renditions of major airports with decent aircraft and adventures. Sadly a frame-rate hog in both FS98 and 2000 and adventures are complex.

Just Flight £29.99

Requirements: FS98/2000

www.justflight.com

Featured: Issue 4

**FS Clouds 2000**

Fantastic effects with a minimal frame-rate hit and apart from a few graphic glitches it is a worthwhile improvement on Microsoft's own fluffy stuff.

Just Flight £24.99

Requirements: FS2000

www.justflight.com

Featured: Issue 6

**German Airports 3**

Wonderful enhancement for those interested in flying to the Fatherland. Like all beautiful things though, can drain system resources alarmingly.

Aerosoft £24.99

Requirements: FS98/2000

www.aerosoft.com

Featured: Issue 4

**Mad Dog 2000**

Now updated and running in FS2000, a very competent add-on that makes FS2000 feel like a different simulator. Not cheap, but it's much more than just one aircraft.

Lago £34.99

Requirements: FS98/2000

www.lagoononline.com

Featured: Issue 7

**Real Airports**

Some very well executed versions of international airports. With an excellent manual and some adventures, this is a good value package.

Just Flight £29.99

Requirements: FS2000

www.justflight.com

Featured: Issue 10

**737 for Fly!**

A meticulous re-creation of the 737-500 for Fly! Superb detailing is only let down by blurry external textures. Not many commercial add-ons for Fly!, so worth having!

Wilco £18.95

Requirements: Fly! or Fly!2K

www.wilcopub.com

Featured: Issue 6

**Rhein-Ruhr for Fly!**

An excellent addition to Fly! for Europeans - could do with a few more buildings, but all the landmarks are there.

Aerosoft £25.99

Requirements: Fly! & Fly!2K

www.aerosoft.com

Featured: Issue 10

**English Airports**

A vast improvement on the default scenery and while it isn't as instantly impressive as some scenery, it actually works in FS2000 without needing a new PC.

Just Flight £19.99

Requirements: FS2000

www.justflight.com

Featured: Issue 8

HARDWARE

**AFCS II Yoke**

Heavy metal control, hand crafted and definitely the Aston Martin of controllers. Eye-watering price to match, so you need to be serious.

AETI £400.00

www.simpilot.com

Featured: Issue 3

**GeForce 2 GTS**

Fantastic performance, a powerful feature set and frequent driver revisions to keep it fresh - probably the current champion (until the next one!)

nVIDIA £205.00

www.nvidia.com

Featured: Issue 8

**Sirocco Crossfires**

Probably the best speakers for your PC before it becomes your hi-fi. Not recommended for small flats!

Videologic £235.00

www.videologic.com

Featured: Issue 6

**Hercules Prophet 4500**

Good 32-bit colour, high-res performance and a price that won't make you stutter!

Guillemot Corporation £120.00 (approx)

www.thrustmaster.co.uk

Featured: Issue 12

**Go Flight GF45**

A very useful item - no fuss USB unit that takes the place of on-screen avionics display and keyboard controls - buy five for a full radio stack!

Go Flight £79.95

www.goflightinc.com

Featured: Issue 7

**Logitech Wingman Strike Force 3D**

Powerful and smooth force feedback with extensive programmability makes this a wise choice. Shop around as prices vary wildly.

Logitech £89.95

www.logitech.com

Featured: Issue 9

OTHER PROGRAMS

**SimCharts**

Genuine Jeppesen airport charts (to all intents and purposes) at a bargain price. But they're on the CD and you need a decent printer. Treat yourself to the expensive pack and get printed en-route charts too.

Jeppesen £19.99/£29.99

www.jeppesenpcpilot.com

Featured: Issue 2

**ProFlight 2000**

One of the best ATC/adventure generators around, with enough customisation potential for everyone. Plan adventures with real voice ATC - even with amusing 'local' accents.

Just Flight £34.99

Requirements: FS2000

www.justflight.com

Featured: Issue 8

**Final Approach**

Good value package that not only solves the mystery of IFR approaches, but also provides fistfuls of airport plates too. Not for the casual flyer though.

Just Flight £24.99

www.justflight.com

Featured: Issue 5

**FS Design Studio Pro**

A great package for designing scenery and aircraft. While relatively easy to use it can be tricky to place scenery accurately. Used by many developers, which proves its worth.

Abacus £24.99/£44.99

Requirements: FS2000

www.abacuspub.com

Featured: Issue 5

**Ultimate Airlines**

A comprehensive list of worldwide flights - a must have for VA pilots or anyone wanting to recreate airline operations.

Flight One £24.99

Requirements: FS2000

www.flight1.com

Featured: Issue 9

THE *ONLY* HUB FOR VIRTUAL AIRLINES

Adrian and Ben, the airline men!



The featured VA for this issue is unlikely to get any threatening letters from real airlines, because to our knowledge there isn't a real-world airline called A & B. The name A & B Airlines comes from the names of the chaps who run it, Adrian and Ben. Rather than moving the great unwashed around the planet, A & B Airlines is based at RAF Brize Norton and they fly VC-10 and C-17 Globemaster transports on

military operations. There are some interesting flight plans on their website, including a training flight from Brize Norton to Dalcross, but no fancy logos or complicated management titles, which we found quite refreshing. If you want to haul for the RAF, this is the VA for you.

Derek Smalls



CONTACT DETAILS

Recruitment: mr257@hotmail.com
Website: www.geocities.com/ab_airlines

MORE VAs AROUND THE GLOBE

It's getting increasingly risky running a VA based on a real airline. We'd strongly suggest that anyone running such a VA or planning one, gets some written authorisation. Most airlines will probably say no, but if you put your case logically to the PR department that you're 'fans' they might well understand. We've had so many requests to include details of VAs that for reasons of space it's been necessary to only include their name and web address. You can always get the flavour of a VA from a quick trip to their website. Please let us have any feedback on your experience of VAs that we list and also let us know if any of the links are incorrect or defunct. If you have a virtual airline that is not listed here, then please feel free to send in a short description to mail@pcpilot.net where we will endeavour to include it in a future issue.

60th HELICOPTER SUPPORT UNIT
WEB: www.geocities.com/60thvaw/60thsu/index.html

A & B AIRLINES
WEB: www.geocities.com/ab_airlines

AFRICAN EXPRESS (AFEX)
WEB: www.afex.co.za

AFRICAN INTERNATIONAL AIRLINES
WEB: www.evalunet.com/aia/

AIR JET UK
WEB: www.flightsimnetwork.com/airjet/

AIR LINGUS
WEB: <http://aer-avensis.hypermart.net/main.htm>

AIR UMBRELLA
WEB: www.airumbrella.com

AIR WE GO
WEB: www.airwego.org.uk/

AIRKENT UK
WEB: www.airkentuk.co.uk/

AIRSOURCE VIRTUAL EMPLOYER
WEB: www.ar-source.com

ALASKA VIRTUAL AIRLINES
WEB: http://alaska_va.tripod.com/

ATLANTIC AEROSPACE CORPORATION
WEB: www.atlanticskies.com

BAHAMASAIR VA
WEB: <http://cybermoo.net/bahamasair>

BRITANNIA VIRTUAL AIRLINES
WEB: www.BritanniaVA.co.uk

BRITISH VIRTUAL AIRWAYS
WEB: www.bvair.com

BROOKS AIR VA
WEB: www.brooksair.co.uk

CALIFORNIA AIR
WEB: www.californiaAir.net

CANARY AIRLINES
WEB: <http://cairlines.wigloo.com>

CARGO VA
WEB: www.cargova.com

DC3 AIRWAYS
WEB: www.dc3airways.com

EASTERN VIRTUAL AIRLINES
WEB: www.evair.com/index.htm

EUROPAIR VIRTUAL AIRLINES
WEB: www.europairva.net

EUROPEAN WORLD AIRWAYS
WEB: <http://ewa.ibusinessdot.com>

EUROSTAR AVIATION
WEB: www.esava.net

GO-VIRTUAL
WEB: www.trudg.freemove.co.uk

HAWAIIAN AIRLINES VA
WEB: www.gorji.com/hawaii.html

ICELAND AIR
WEB: www.allineed.is/icelandairva

JERSEY GROUP OF AIRLINES
WEB: www.jersey-va.co.uk

JERSEY GROUP OF AIRLINES
WEB: www.jersey-va.co.uk

JGO INTERNATIONAL AIRLINES
WEB: www.virtualjgo.8m.com

JMC VIRTUAL AIRLINES
WEB: www.virtualjmc.homestead.com/main.html

KNIGHT AIR
WEB: www.knightair.org

MANCHESTER AIRWAYS VA
WEB: <http://manchester.atcworldstar.com>

MAVERIC VA
WEB: www.mavericva.co.uk

NEW YORK CENTRAL & ADIRONDACK VA
WEB: www.flightsimmers.net/airport/nva/

NOBLE AIR
WEB: www.nobleair.com

NORTHWEST VIRTUAL AIRLINES
WEB: www.groverweb.com/nwva/

OXAIR VIRTUAL AIRLINES
WEB: www.oxair.homestead.com

PACIFIC BREEZE VA
WEB: www.pacbreezeva.com

PACIFIC WEST AIRWAYS
WEB: www.pacificwestairways.com

PARADISE WORLD AVIATION
WEB: www.pwaviation.com

POLAR AIRWAYS VIRTUAL AIRLINE
WEB: www.polarairways.com/

SOLENT AIRLINES
WEB: www.solentairlines.btinternet.co.uk

SOUTHWEST VIRTUAL
WEB: <http://www.virtualswa.com>

TEXAS AIR CARGO
WEB: www.geocities.com/texas_air_cargo/

TRANSVIRTUAL AIRLINES
WEB: www.transvirtualairlines.org

VIRGIN SUN
WEB: www.members.aol.com/Afre63456/vvs/

VIRTUAL 2000
WEB: www.virtualair2000.co.uk

VIRTUAL BRITISH CALEDONIAN AIRWAYS
WEB: www.avsim.com/hangar/air/vbca/index.html

VIRTUAL DELTA AIRLINES
WEB: <http://virtualdelta.cjb.net/>

WEST EUROPEAN AIRLINES
WEB: www.weva.homestead.com/main.html

WESTWIND VA
WEB: www.flywestwind.com

WINGS INTERNATIONAL ALLIANCE
WEB: <http://members.xoom.com/wingsint>

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printed
manual!

This is perhaps the most detailed aircraft ever created for Microsoft Flight Simulator. The 737-400 is the world's most popular airliner and this virtual incarnation is packed with features, giving you the unique opportunity to experience the sights, sounds, and ambience of this incredible aircraft.



In the air or on the ground...
...Fly the flag you choose.
Over 30 international airline
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round wheels.



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Available in the USA through:

FLIGHT 1
SOFTWARE
www.flight1.com
Tel: 1-877-PCPILOT



11th September 2001